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ABSTRACT

This study investigated the concept of organizational effectiveness as proposed by Rensis Likert and his colleagues at the University of Michigan. The study focused on the causal relationship between the model's variables and on how the model could be used to analyze problems in secondary school educational administration. Data for this study were obtained from the "A Study of Schooling" (SOS) research project. The problem and its setting are examined in the first chapter of this report. Chapter II provides an overview of the general literature on organizational effectiveness. Chapter III presents an overview of the SOS, and actual data sources used in this study are examined. Chapter IV discusses the analysis of Subproblem One, which deals with the operationalization of the Likert model and examination of the internal consistency of the resultant formulation. Chapter V discusses the analysis of Subproblem Two, which tests the causal model as specified from Subproblem One. Chapter VI discusses the results of Subproblem Three, which proposes and tests alternative causal models derived from the initial Likert conceptualization. Chapter VII summarizes the study's findings and presents recommendations for theoreticians and practitioners. It was found that Likert's model could be operationalized with the data obtained from SOS, although a modified version of the Likert model did not fit the SOS data. Results also indicated that a better causal model could be developed. Tables, figures, and appendices present data analyzed for this report, and a bibliography of over 300 publications is included. (CJ)

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A STUDY OF SCHOOLING
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A CAUSAL ANALYSIS OF SATISFACTION, PERFORMANCE, WORK ENVIRONMENT AND LEADERSHIP IN SELECTED SECONDARY SCHOOLS

Richard E. Daly

Technical Report No. 31

1981

A Study of Schooling is based upon the assumption that improving schools requires knowing what is happening in and around them. A comprehensive data-base of contextual information was obtained from students, teachers, administrators, parents and observers at all grade levels in thirty-eight elementary and secondary purposively sampled schools. *It is strongly recommended that readers of any technical report in this series first read Technical Report No. 1 which outlines the details, scope and limitations of the Study as a whole.*

It must be understood that this series of technical reports does not constitute the Study. Some reports are highly specific "molecular" inquiries while others take a more "molar" view across data sources, schooling levels, etc. Some reports are more methodological in nature arising out of issues in data analysis. Many of the reports quite naturally overlap in data analysed and interpretations rendered. Some authors have approached their task as consisting mostly of data description with little discussion beyond the presentation of the data. Others have ventured further into the realm of interpretation and speculation. *It must be further understood that data-based inferences can and do differ among researchers who come at the data from differing points-of-view.* Authors, therefore, are duly acknowledged for each report and are responsible for the material presented therein.

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CHAPTER I

THE PROBLEM AND ITS SETTING

PROBLEM STATEMENT

The purpose of the present study was to investigate the concept of organizational effectiveness, specifically that set of theories concerning the effective organization first proposed by Likert and his colleagues at the University of Michigan. Further, it was hoped that it would be possible to examine the relations among the causal, intervening, and end-result variables of Likert's model. Such a study would allow inferences to be drawn about the magnitude and directionality of the proposed causal relationships. If the data did not lend themselves to analysis using Likert's model, the model would be modified in an attempt to best explain the data collected by the Study of Schooling.

BACKGROUND TO THE PROBLEM

The literature on organizational behavior makes frequent reference to the organizational effectiveness construct. Before the 1950's, research in the area was conducted primarily by sociologists using the case study approach. This was followed by the era of the goal-oriented social psychologist and management theoretician. The publication in 1957 of the Georgopoulos and Tannenbaum criterion study marked one of the first attempts to examine organizational effectiveness as a discrete topic in the literature. This study also marked the beginning of the dominance of the systems approach to the study of effectiveness. Until this time, effectiveness research had been embedded in broad treatments of organizational behavior. During the 1960's, comparative analyses began to be reported. This was followed, in the early 1970's, by a general lack of interest in the area. From 1975 until the present, however, there has been a resurgence of interest in the topic.

Recent developments in society and new trends in social science have interacted to produce renewed interest in the topic of organizational effectiveness. These developments and trends include: (1) advances in organization theory and shifting managerial needs; (2) emergence of the field of organization development; and (3) emergence of the field of evaluation research.

Advances in Organization Theory and Shifting Managerial Needs

The domain of organizational theory is linked in many ways to the concept of effectiveness. The study of behavior in organizations began primarily as an attempt to increase productivity and most of the conceptualizations in the field address this topic in one way or another. Two currently significant paradigms--systems theory (Katz & Kahn, 1966) and contingency theory (Lawrence & Lorsch, 1967)--are intimately involved with the debate over systems vs. goal-centered approaches to the evaluation of effectiveness. Yet there still remains a lack of well-substantiated theory having significant predictive power. In part this is a result of the difficulties inherent in conducting comparative organizational research and, in part, a result of the lack of attention paid to examination of the topic of effectiveness.

The accelerating rate of technological change, decreasing availability of energy resources, and changing character of the workforce are combining to make the manager's job more demanding. Managers are being required to make increasingly complex decisions concerning organizational goals, structures and managerial practices. Good decisions are based on sound data--thus the need for more accurate information about how well the organization is doing, as measured by its own criteria of effectiveness. Once specific characteristics of effectiveness are identified, the manager can examine data related to these criteria in order to both assess the present state of the organization and to aid in the development of plans for future improvement. Knowledge about the organizational characteristics actually associated with effectiveness can greatly enhance the accuracy of these decisions.

Emergence of the Field of Organization Development (OD)

Organization Development represents a relatively recent inter-disciplinary approach to the facilitation of planned change in organizations. It is an expanding field. Programs utilizing OD methods for the facilitation of change have been conducted in hundreds of organizations over the past twenty-five years. Full time practitioners now number over one thousand.[1] A recent directory of applied behavioral sciences consulting organizations (Jones & Pfeiffer, 1975) listed eighty-three firms in the U.S. and Canada employing two or more consultants and specializing in OD activities. An annotated bibliography of OD reference materials (Pate, 1976) reviewed some 550 articles and books published between 1970 and 1975. Numerous definitions of the domain of OD have been offered (Beckhard, 1969; Bennis, 1969; Burke, 1971; French, 1969; Friedlander & Brown, 1974; Myers, 1968), and a synthesis of the various perspectives is difficult. There are, however, several points on which substantial agreement has been reached:

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[1] Based on data reported by Armenakis, Feild, and Holley (1976).

(1) OD is concerned with the management of organizational resources in an era of increasingly turbulent environments.

(2) OD adopts a systems view of organizations. OD programs are viewed as a series of interrelated action programs, conducted on an organization-wide basis. It is not a set of loosely-coupled, one-shot training efforts.

(3) OD attempts to increase the effectiveness of the managerial subgroup as well as that of the organization as a whole. It incorporates many of the theories of Argyris (1962), Fiedler (1967), Lawrence and Lorsch (1967), Likert (1961, 1967), Maslow (1970), and McGregor (1960, 1962), among others. These authors are most concerned with delineating the organizational processes and interpersonal relationships which impact leadership in effective organizations.

(4) OD typically utilizes the action-research approach.[2] This approach brings theoretical knowledge to bear on specific practical problems. It is characterized by a high degree of involvement of the researcher in the immediate action setting of the problem, and has as its goals both problem solution and the advancement of scientific knowledge.

Early attempts at describing the results of OD interventions were generally limited to subjective, anecdotal case studies. Even at the time, however, some OD theorists had begun to address the relative paucity of rigorous research in the field (Mann & Neff, 1961; Marrow & French, 1945; Sofer, 1961; Trist & Bamforth, 1951). It was recognized that, in order to adequately assess the impact of a change intervention, it was first necessary to generate baseline data. The search for such data led a number of the OD researchers to the extant literature on organizational effectiveness. By the early 1960's these theorists had begun looking at the problem of organizational effectivenss (Bennis, 1963; Blake & Mouton, 1964; Friedlander & Pickle, 1968), with the bulk of this literature focused on efforts directed toward specification of the criteria for defining an effective organization.

---

[2] Jenks, 1972, p. 258, notes that researchers employing the action research model do so for several reasons: "(1) to demonstrate the validity of their theoretical hypotheses about orgnizations, (2) to obtain a diagnosis of the state of affairs in the organization on particular dimensions, (3) to test the impact of change(s) on the organization, (4) to clarify and show directions toward solution of practical problems, (5) to help the organization see directions for adaptive change and growth and to provide data on the organization's movement in those directions."

By the 1970's, other OD researchers had picked up on these criterion measures and were attempting to apply them as measures of the success or failure of planned change efforts (Bowers, 1973; Franklin, 1976; Tichy & Nisberg, 1976). These measures allowed for the quantification of data and for subsequent analysis using (in some cases) relatively sophisticated statistical techniques. Yet, as Franklin's (1973) extensive examination of the literature showed, only 25% of the OD studies reviewed included any type of evaluative data. Recently, articles have appeared which focus solely on the topic of evaluation of OD (Armenakis, Feild, & Holley, 1976; Armenakis & Smith, 1978; Gavin & McPhail, 1978; Kilmann & Herden, 1976; King & Sherwood, 1974; Morrison, 1978; Nicholas, 1979; Porras & Berg, 1978; Rich & Zaltman, 1978; Zmud, 1978), but agreement has not been reached on either methodological approaches or utilization strategies.

Theoreticians in the field are, however, beginning to identify a set of needs which must be met if the field is going to continue to expand and to offer more useful services to organizations.

(1) There is a need to increase the effectiveness and efficiency of various OD efforts and programs. OD practitioners, like the organizations they serve, are increasingly being held accountable by their publics and clients.

(2) There is a need to determine which OD programs/treatments/interventions work most effectively.

(3) There is a need to better understand the change process. This will lead to increased capability for accurate, useful theory construction and will increase the predictive power of the theory base.

(4) There is a need for more comparative research. This will help to explain what actually occurs during the change process.

(5) There is a need for improved measurement capability. This will lead to an improved overall research capability and to an enhanced ability to conduct evaluation through procedural improvements for data collection and analysis.

(6) There is a need to develop procedures for giving better, more relevant, and accurate feedback to the client system for its own decision-making process.

Emergence of the Field of Evaluation Research

Evaluation research has developed as a discrete discipline, having, like OD, its own body of theory, its own group of practitioners and its own embryonic set of ethics. The field grew from the parent disciplines of education, public health, and political science in response to the same societal needs which helped to spawn renewed interest in the organizational effectiveness construct and the approaches to the enhancement of effectiveness represented by OD.

Evaluation research has been contrasted with pure or basic research and with action research. Where pure research is concerned primarily with the generation of knowledge, action research both with knowledge and with practice, evaluation concerns itself with decisions based on application. Pure research is descriptive in nature, action research is prescriptive and evaluation research is evaluative, judging program worth and assessing program outcomes. Evaluation addresses questions of interest to the client system in the belief that generation of reliable and valid data will enhance the effectiveness of the decision making process.

Weiss (1972, p. 4) has described the purpose of evaluation research as: "...to measure the effects of a program against the goals it set out to accomplish as a means of contributing to subsequent decision making about the program and improving future programming." Other evaluation theorists (Suchman, 1967; Stufflebeam, 1974) would probably agree while adding that evaluation also serves an accountability function. That is, it provides data to extra-organizational entities (federal government, funding agencies, consumer groups, clients, etc.) for decision making about the continuation or refunding of programs. Persons interested in employing the results of evaluation research (either for decision making or for purposes of accountability) are implicitly searching for answers to the question of effectiveness. Summative evaluation, conducted at the conclusion of a program or project, directly addresses the question of overall program effectiveness, and by implication, the overall effectiveness of the organization set up to conduct the program. Formative evaluation, conducted for purposes of ongoing decision making, can make use of client generated, short term effectiveness criteria.

NEED FOR THE PRESENT STUDY

The present study has been designed to meet a number of needs, both substantive and methodological, which appear to be unmet in the field of organizational behavior. Several of these areas of deficiency will now be briefly discussed.

Substantive Needs

There is a need for the evaluation of organizational change efforts. Since most of these efforts are directed at helping the organization become more "effective," a need exists for: (1) more generalizable models of the effectiveness construct; and (2) more accurate definition of effectiveness indicators, for purposes of evaluation. Scott (1977, p. 74-75) has argued for the development of a limited set of criteria which: "(1) make explicit the normative basis for our choice; (2) call attention to those who support or share them and to those who oppose them; and (3) allow us to make more specific comparisons between organizations along the dimensions selected."

Such comparisons could form the basis for a pool of normative, cross-organizational evaluation criteria, to be used in assessing the utility of change interventions. Thus, the present study was designed to explore the concept of effectiveness in an attempt to provide some insight into possible approaches for the evaluation of organizational change activities.

On a smaller scale, the present study was conceived as an attempt to examine the theory of effectiveness developed by Likert and his associates at the University of Michigan, but to do so using instruments other than those developed by Likert. This theory has related to it a large and growing data base, most of which has been generated by Likert's own instrumentation. The Survey of Organizations (SOO) is a machine-scored instrument package first developed by Likert and his associates at the University of Michigan's Institute for Social Research (Bowers & Seashore, 1966; Georgopoulos & Mann, 1962; Kahn & Morse, 1951; Katz, Maccoby, Gurin, & Floor, 1951; Likert, 1961; Mann, 1965; Mann & Hoffman, 1960; Morse, 1953). Since its initial development, the SOO has been successfully administered to over 20,000 managers and to more than 200,000 non-supervisory employees.[3] The Profile of Schools (POS) was developed in response to a perceived need for a similar instrument package, but one focused specifically on school organizations (Rensis Likert Associates, 1972; Rensis Likert Associates, 1978; Siepert & Likert, 1973).

Lastly, the domain of research in educational administration provides relatively little guidance concerning the nature of the effective school organization. Few models exist that operationally define effectiveness or lend themselves well to empirical verification. The current study was designed in order to examine one such theory of effectiveness--Likert's--originally developed in the private sector, but later modified for use in schools.

Methodological Needs

There is currently a shortage of attempts to examine organizational effectiveness across organizations (Campbell, 1974; Cummings, 1977). Cummings argues that such organizational-level analyses must be conducted using multivariate approaches. Campbell agrees with the need for comparative studies, while disagreeing with the methodology to be used. He suggests instead that more qualitative methodologies be employed, including various types of naturalistic observation strategies and techniques.

There is a need for more substantive application of the several causal modeling techniques now available to social scientists. The concept of causality is an ubiquitous one in the social sciences (Rhodes,

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[3] Taylor and Bowers, 1972.

1971). Despite many years of debate over the uses and misuses of the term, the search for causal relationships, ultimately leading to prediction and control, goes on. Substantive applications of the techniques first developed by Wright (1921) and amplified by Simon (1957), Blalock (1961), and Duncan (1966) are relatively limited, especially in the field of organizational behavior.

Lastly, there remains a need for exploratory empirical work utilizing causal modeling approaches. Jermier and Schriesheim (1978, p. 327-328) have noted that most of the available literature reports results of model testing conducted on simple causal models:

> "...few authors specifying path models consider alternate causal orderings, although theories in the organizational sciences rarely provide the (undebatable) causal orderings necessary for testing only a single model. As a consequence, most path analytic results beg the question of causal ordering and provide (support) for one model when another may be equally or more plausible."

The present study was conceived as an exploratory one designed to avoid the trap of reification of debatable causal ordering.

THE LIKERT MODEL OF ORGANIZATIONAL EFFECTIVENESS IN SCHOOLS

Attempting to define any single model as the Likert model of effectiveness in schools presents a number of problems, since Likert has been so prolific in his writings on the subject. In addition, a number of other authors have extended, condensed, or otherwise modified some of the concepts originally proposed by Likert. Nevertheless, it should be possible to briefly summarize the major components of his general model which are basic to the understanding of the current study. Figure 1.1 depicts these major components in a rough causal ordering. As shown in the figure the variables of the model may be grouped into three classes: Causal, Intervening, and End-Result.

The Causal variables are those which are modifiable by the leadership of the school. These variables influence all of the activity which occurs internal to the school, as well as influencing the school's outputs. The causal variables are the independent variables of the model. Included in this category are Organizational Climate, Leader Style and Behavior, Organizational Policy, Organizational Structure, and the core Technology of the system.

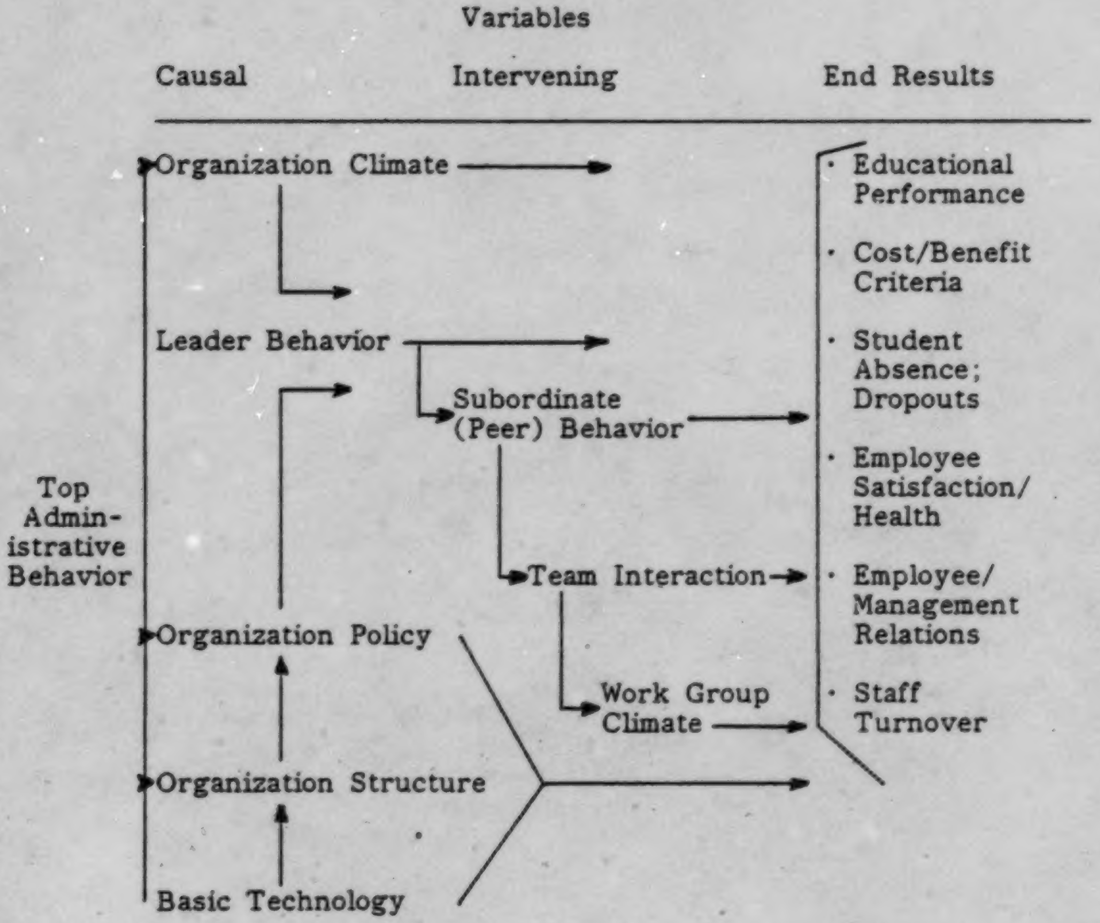
The Intervening variables are the mediator variables of effectiveness research. Represented here are concepts relating to the internal state and "health" of the school. These variables include Subordinate Behaviors (the leader-like behaviors exhibited by members of the teaching staff), Team Interaction (communication processes, internal decision making practices, influence sharing, individual attitudes), and Work Group Climate (the internal manifestation of the policies, practices and general leader behaviors of higher organizational levels).

The End-Result variables are the dependent variables and represent organizational outputs. These outputs include Educational Performance, Employee Satisfaction, Employee/Management Relations, Staff Turnover, Student Absence/Dropouts, and any Cost/Benefit criteria.

The processes by which these variables are related is depicted by the network of arrows in Figure 1.1. The behavior of the top administrative group (superintendent, school board, etc.) influences the organizational structure of the district, the district-wide policies, and the or-

FIGURE 1.1

A SYSTEMS APPROACH TO ORGANIZATIONAL EFFECTIVENESS IN SCHOOLS (SIEPERT & LIKERT, 1973)


Variables
Causal
Intervening
End Results
Organization Climate
Leader Behavior
Subordinate (Peer) Behavior
Top Administrative Behavior
Team Interaction
Organization Policy
Work Group Climate
Organization Structure
Basic Technology
· Educational Performance
· Cost/Benefit Criteria
· Student Absence; Dropouts
· Employee Satisfaction/ Health
· Employee/ Management Relations
· Staff Turnover

NOTE: Figure 1.1 is a slightly adapted version of a figure appearing in Siepert and Likert, 1973, and copyrighted by Rensis Likert Associates, Inc., 1972. Permission for use has been requested.

ganizational climate of the school. This climate, this "tone," if you will, is a result of the standards, policies, procedures, expectations and leader behaviors of the upper managerial subsystem. Middle managers (principals) receive the climate as an input into their individual schools. They then exhibit their own leadership behaviors, set their own policies, and develop their own structures--all within the constraints imposed from above. Climate is thus seen as a collection of practices or actions, not as a measure of emotional feelings or of the social environment of the school.

Principal leader behavior directly influences the amount, type and direction of leadership behaviors emitted by the teaching staff toward one another. These peer behaviors, in turn, impact upon the levels of cohesiveness, support, and group interaction which occur among the staff. The amount or level of team interaction in turn has an influence upon the climate of the work group. All of the causal and intervening variables influence, in some way, the outputs of the school.

NATURE OF THE STUDY

The present study was designed to both examine the theory of effectiveness articulated by Likert and to explore alternative structural arrangements of the major components of that theory. The study began with selection of an area of research interest--organizational effectiveness--followed by a review of the literature in a search for theories amenable to investigation, given the available data base. After selection of Likert's theories and of an appropriate methodology, an initial theoretical operationalization was attempted. This operationalization was developed primarily from the tenets of the theory, but with some feel for the types of data actually at hand. Based on this initial operationalization, a subfile structure was created and extended to include all of the various types of available data. The data were then grouped as necessary and the reliability and construct validity of all items was examined. Items not demonstrating high correlation with others selected as measures of a given subindex were deleted, as were items showing uniformly high correlations across all subindices. In addition, several subindices were redefined, using other items from the data pool. This process resulted in the initial subindex structure. Then, the reliability of the subindex structure was examined by comparing the between-groups correlations for all subindices, and the subsequent deletion of several as potential index measures.

Next, the indices were constructed, using the remaining subindices. This process resulted in the creation of 6 indices, composed of 28 subindices. After reviewing these indices and comparing them with the tenets of Likert's theory, 15 subindices were selected for inclusion in the first specification of the model. The structural equation model was then examined using the LISREL IV program. Following the initial model testing it was determined that the original Likert model (as operationalized) could not be fit, given these data.

Finally, four alternative indices were developed from items and subindices included in the original (Likert) specification. A factor analysis was then performed in order to select optimum indicator subindices. After a review of the literature on schools as organizations, two additional variables were selected as possible exogenous variables for the alternate models of effectiveness. A series of models was then tested consisting of the four indices and of the two other causal variables, SES and Environment. Finally, a number of alternate models of organizational effectiveness were proposed and compared, with one model being ultimately selected as providing the best fit to the available data.

SUBPROBLEM STATEMENTS AND RESEARCH HYPOTHESES

In order to facilitate the analysis of the general problem area, it was decided to divide the problem into three subproblems. A research hypothesis was developed for each subproblem.

Subproblem One

Subproblem Statement

The first subproblem was to operationalize Likert's model and to examine the internal consistency of the operationalization that was produced.

Research Hypothesis

The research hypothesis for Subproblem One was that Likert's model of effective organizations could be operationalized for testing using data derived from instruments other than Likert's own Profile of Schools or ISR's Survey of Organizations. If this hypothesis is accepted, then further subproblems and research hypotheses would be built upon the data set generated by the data treatment procedures of this subproblem.

Subproblem Two

Subproblem Statement

The second subproblem was to test the plausibility of the postulated relationships among the variables of Likert's model as operationalized by SOS data from Subproblem One.

Research Hypothesis

The research hypothesis for Subproblem Two was that the model of organizational effectiveness proposed by Likert does represent the causal relationships among the selected variables. Should this hypothesis be rejected after model testing, further models would be proposed and evaluated in a search for a model to adequately fit the data.

Subproblem Three

Subproblem Statement

The third subproblem was to propose and test alternative causal models which incorporate selected variables from the original Likert model as examined in Subproblem Two.

Research Hypothesis

The research hypothesis for Subproblem Three was that one or more alternative causal models would better represent the causal relationships among the available variables than would the original model from Subproblem Two.

ORGANIZATION OF THE REMAINDER OF THE STUDY

Chapter II first presents an overview of the general literature on organizational effectiveness. This is then followed by an explication of the Likert model, especially as it relates to the effectiveness of school organizations. The final section of the chapter presents a summary of recent empirical work which has used the Likert model as a conceptual focus.

Chapter III presents an overview of the Study of Schooling, including the sampling plan used by IDEA, a brief discussion of the instrumentation employed in data collection, and the data collection procedures themselves. Following this, the actual data sources utilized in the present study will be examined. Finally, the reader will be introduced to the flow diagram detailing the data treatment procedures to be employed for each of the three subproblems of the study.

Chapter IV discusses the results of the analysis for Subproblem One. This subproblem deals with operationalization of the Likert model and examination of the internal consistency of the resultant formulation. Reasons for the selection of the Likert model will be offered, followed by a section dealing with the statistical methodology chosen for data analysis. Theoretical operationalization will be discussed, including a complete listing of all operational definitions. Finally, item and subindex reliability will be examined.

Chapter V discusses the results of the analysis for Subproblem Two. This subproblem tests the causal model as specified from the preceding subproblem. After examining the construction of the indices for the model, 15 variables will be chosen to define the six latent constructs of the Likert conceptualization, as modified for the present study. Finally, the model will be tested and the results interpreted.

Chapter VI discusses the results of the analysis for Subproblem Three. This subproblem proposes and tests alternative causal models derived from the initial Likert conceptualization. First, the structural and measurement submodels of the model tested in Subproblem Two will be respecified. That is, the indices will be redefined and reordered as necessary. This will be followed by the selection of 14 variables to define the four latent constructs of the alternative models. After a detailed examination of 40 alternative models, two will be selected as providing reasonable explanations for the data from the Study of Schooling. Ultimately, one model will be proposed as the best fitting model.

Chapter VII will present a summary of findings from all preceding chapters. This will be followed by interpretation of the model developed in Chapter VI. A series of recommendations will then be offered. These will be directed to (a) theoreticians and (b) practitioners. The chapter will conclude with a discussion of limitations on the findings of the study.

GENERAL LIMITATIONS AND ASSUMPTIONS

Several general limitations on the present study must be recognized. More specific limitations pertaining to each individual subproblem will be discussed as they are appropriate.

Secondary Analysis

The study is a secondary analysis of previously collected data. Hence, there is a certain amount of underfit between the data themselves and the research questions presently under investigation. However, as Glaser (1962) has noted, secondary analysis offers the social scientist several advantages, not the least of which is the ability to make use of data gathered at great expense for other reasons. Also, in the present instance, the problems under investigation by the SOS were quite similar to those proposed for this study.

Data Sources

The study will only examine secondary schools. It will focus on teacher perceptions of the school, not on administrator perceptions. The study will include parent and student data only as they relate to overall performance of the school.

Limits of the Chosen Model

Two important independent variables often specified as part of the general organizational effectiveness construct, structure and individual characteristics, were not operationalized in the present study. These variables are not explicitly recognized by the Likert model of effectiveness.

Trends Over Time

Likert (Likert & Bowers, 1969) has suggested that time is a crucial factor in the evaluation of effectiveness. Research data should not be evaluated at a single point in time, but rather using a time-wave design. Likert, Bowers and Norman (1969) have noted that correlational analysis conducted on data collected at a single point in time will show the strongest relations existing between variables closest in the causal sequence of the model. All of the SOS data was collected within a twenty-day period for any given school. This implies that correlations between causal and end-result variables are likely to be weaker than they would be if data were collected over time.

Assumptions

- It is assumed that the twenty-five secondary schools can be described, using Likert's causal, intervening and end-result terminology.
- It is assumed that the causal, intervening and end-result variables are related in some causal way.
- It is assumed that causal relationships within such a complex entity as a school organization can be portrayed using statistical techniques and logical deduction.

DEFINITION OF TERMS AND ABBREVIATIONS

Definition of Terms

Organizational Effectiveness

Organizational effectiveness has been defined in numerous ways. One conceptualization that comes closest to capturing the meaning of the term as used in the present study is that of Campbell (1977, p. 18):

> "Perhaps a better way to think of organizational effectiveness is as an underlying construct that has no necessary and sufficient operational definition but that constitutes a model or theory of what organizational effectiveness is. The functions of such a model would be to identify the kinds of variables we should be measuring and to specify how these variables, or components, of effectiveness are interrelated--or *should* be interrelated."

Causal Variables

Causal variables are those which are modifiable by the school leadership; and which can, if so modified, bring about changes in other variables. They are the independent variables of the study. Climate and Leadership are examples of causal variables.

Intervening Variables

Intervening variables are those which represent the internal state of the school. They are affected by the causal variables. Trust and Peer Leadership are examples of intervening variables.

End-Result Variables

End-result variables are those which represent the achievements or outputs of the school. They are the dependent variables of the study. Job Performance and Job Satisfaction are examples of end-result variables.

Other Causal Variables

Other causal variables are those which are outside of the control of the school leadership. If they are modified, they can bring about changes in the other variables. SES, environmental stability, faculty ethnicity, faculty education level are representative other-causal variables. It should be noted that these variables are not a part of the Likert conceptualization of effectiveness in schools. Rather, this category represents a group of constructs which have been found by other researchers to significantly impact the outcomes of the educational process.

Abbreviations

IDEA

IDEA is an abbreviation used for The Institute for Development of Educational Activities, Inc., c/o School of Education, University of California, Los Angeles, CA 90024. This research organization was responsible for collecting the data used in the present study.

SOS

SOS is an abbreviation used for the Study of Schooling in the U.S.A., the title of the IDEA project wherein the data were collected.

POS

POS is an abbreviation for the Profile of Schools, Likert's school organization assessment package.

SOO

SOO is an abbreviation for the Survey of Organizations, a more general organizational assessment package, also based on Likert's theories.

CHAPTER II

THE REVIEW OF THE RELATED LITERATURE

The study of schools as organizations has drawn heavily on theoretical and empirical work based in the private sector. This is nowhere better illustrated than in the literature on organizational effectiveness. Few studies[4] having effectiveness as their primary focus have been conducted in the educational domain. For the most part, this is acceptable, as Carver and Sergiovanni (1969, ix) point out:

> "Research to date has revealed that human behavior, as a result of organizational life, manifests remarkable similarities as one moves from hospital, to school, to retail store, to welfare agency, and to military unit... Accountants, middle managers in business and industry and teachers report remarkably similar orientations to satisfying and dissatisying factors in their work."

On the other hand, educational systems are different from business organizations in that systemic inputs and outputs are much more difficult to analyze in schools. This presents problems if one wishes to accurately specify causal variables and the relationships between them and the output or end-result measures. In addition, certain other causal variables have been identified as impacting schools (i.e., SES, home environment) which do not have counterparts in the private sector. Consequently, the impact of organizational climate, leadership style, structure, etc. upon school performance is not well understood.

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[4] The work of Bidwell and Kasarda (1975) is one significant exception. Employing a goal attainment model they conducted a secondary analysis of data (using path analysis) from 104 school districts. Their dependent variable was performance, as measured by standardized achievement scores. Independent variables included environmental conditions (size, SES, ethnicity); and organizational attributes (pupil-teacher ratio, administrator-teacher ratio, other structural measures). Their findings indicated: (1) High pupil-teacher and low administrator-teacher ratios tend to have a negative impact on achievement. (2) Highly qualified staff have a positive impact. (3) Ethnicity has direct effects on achievement. (4) Other environmental conditions, especially fixed resources, have indirect effects on achievement, through direct effects on staff qualifications and district structure. Publication of their work prompted a spirited dialogue (Alexander & Griffin, 1976a, b; Bidwell and Kasarda, 1976a, b; Hannan, Freeman, & Meyer, 1976), both on substantive and methodological issues.

The literature reviewed in this chapter reflects the trends noted above. The section on organizational effectiveness is concerned with general models of the effectiveness construct. This is then followed by a somewhat more detailed analysis of a specific model of effectiveness (the Likert approach) that has been repeatedly applied to school organizations.

ORGANIZATIONAL EFFECTIVENESS

The literature on organizational behavior makes frequent reference to the organizational effectiveness construct. Early theoreticians (Barnard, 1938; Gulick & Urwick, 1937; Taylor, 1911) approached the area from a normative perspective, seeking to derive a set of general prescriptions designed to enhance organizational efficiency and effectiveness. Following the period of the classical theorists, and continuing into the 1950's, most research in the area was conducted by sociologists using the case study approach (Selznick, 1949; Whyte, 1948). The topic of effectiveness was not often directly addressed, however, since major theory-building efforts were aimed toward descriptive or developmental analysis of organizations.

By the mid 1950's various social psychologists and management scientists were looking at concepts related to effectiveness. March and Simon (1958) and their colleagues were examining the function and structure of decision making behavior in organizations. Likert (1961) was addressing the use of the human resource. Stogdill (1948) was examining leadership. Herzberg et al (1957) examined satisfaction. And Georgopoulos and Tannenbaum (1957) discussed the concept of organizational effectiveness as a discrete topic.

The 1960's saw continued interest in the field, with a proliferation of approaches designed to test both the nature of the construct and the validity of the criteria used to measure it. By the end of the decade comparative analyses were beginning to emerge, seeking to test the various models and their indicators. During the early 1970's interest shifted away from the topic but has since returned, as a result of developments in society at large and in various fields of social scientific inquiry.

Approaches to the Assessment of Organizational Effectiveness

The literature on organizational effectiveness has been characterized by theoretical pluralism and a relatively small body of empirical work. Most of the published material in the field has been theoretical and has resulted in the specification of numerous criteria,[5] with each particular model based on the author's point of view or field of specialization.

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[5] Campbell (1977) has identified 30 criteria that have been used as indicators of effectiveness, while Steers (1977) has enumerated 32 potential contributors to effectiveness (i.e., independent variables).

This situation has changed somewhat, however, with the emergence of work attempting to integrate various models into a coherent framework (Campbell, 1977; Cunningham, 1977; Pennings & Goodman, 1977; Steers, 1977; Weick, 1977).

The relative absence of empirical work is probably reflective of the difficulties inherent in research conducted where, of necessity, the unit of analysis must be the total organization.[6] Most studies are deductive, attempting to validate theoretical constructs. Inductive studies are often based on reviews of previously published material, rather than upon original research.

The primary debate in the effectiveness literature has been between proponents of the goal-centered and the system perspectives (Ghorpade, 1971; Price, 1972). There have also been attempts to merge the two, to propose one model as a subset of the other (Georgiou, 1973; Scott, 1977; Strasser & Deniston, 1979). Recently this debate has been replaced by a discussion of integrative, contingency-based models (Cunningham, 1977; Kilmann & Herden, 1976; Pennings & Goodman, 1977; Steers, 1977). We turn now to an examination of the classic goal vs. systems perspectives.

Goal-Centered Approach

The goal approach is based on the assumption that organizations and the people within them are continually striving to attain a set of personal and/or organizational goals. Effectiveness is defined as the degree to which the organization either attains its goals or is instrumental in the attainment of personal goals. Members of the organization are viewed as rational, goal-seeking organisms, banding together for the furtherance of common purposes. The number of such common purposes is small enough to be attainable, and the goals are well enough defined so that attainment is measurable. The work of Barnard (1938), Hannan and Freeman (1977), March and Simon (1958), Michels (1949), Parsons (1956), Perrow (1961), Price (1968, 1972), and Webb (1974, 1976) embrace aspects of this paradigm.

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[6] Steers (1975c) review of 17 models of effectiveness found only four of them to be based on empirical data. Several of the models derived deductively were followed by empirical studies, but these were generally conducted using very small sample sizes.

This approach has been criticized on several grounds. Yuchtman and Seashore (1967) base their criticism on: (1) The organization's inability to reach consensus on a set of goals, due to the multiple perspectives of the organizational actors. And (2) when organizational goals are externally defined by the investigator, i.e., when considered in reference to societal functions, consensus is again impossible due to the imposed-from-without nature of the criteria. They argue that the concept of "goal" demands an individual-level analysis. Goals are held by individuals and are different for persons at differing levels of the organizational hierarcy. It is, therefore, difficult to identify an accurate set of organization-wide goals. The search for an ultimate criterion of effectiveness is fruitless. The authors' second criticism arises from the conceptualization of organizations as agencies for the fulfillment of necessary societal functions. They criticize any organizational investigator for deriving a set of criteria based on theory that may not correspond to the intentions or world views of the actors.

Hannan and Freeman (1977) elaborated on Yuchtman and Seashore's first criticism, describing the multiplicity of organizational goals as the basis for much of the conceptual difficulty with the construct. This difficulty is compounded by the nature of the goal construct itself. There may be various types of goals operating in an organization:[7] (A) Official goals, the formal, public goals of the organization. (B) Operative goals, the private organizational goals, often the goal set agreed to by dominant coalitions in the organization. (C) Subunit goals, goals pursued by subsets of the organization. (D) Member goals, individual-level goals pursued by the organization's members. A second major problem identified by these authors is based on differences occurring along temporal lines. Organizations, like individuals, pursue short, intermediate, and long range goals, often simultaneously. Sorting through goal types, when complicated by temporal considerations, makes goal identification and specificity a difficult, if not impossible, task.

Steers (1977) also elaborated on the multi- vs. unidimensional perspective on goals, arguing that the unidimensional construct is unrealistic, basing his criticism on 3 factors. First, there are problems with the official, operative, operational[8] typology, as noted above. Secondly, there are differences in first- and second-order goals. Some goals are more important to the organization (first-order) than are others. Thirdly, the goal-maximization approach is unrealistic. The organization is viewed as pursuing a finite set of goals, none of which will be maximized. Goal attainment of any subunit is constrained by available resources and by the value of such attainment to the total system.

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[7] March and Simon, 1958; Perrow, 1961.

[8] Operational goals are those for which criteria exist so that goal attainment may be measured (Perrow, 1961).

Scott (1977) argued that the concept of goals is not one that can be dismissed when evaluating organizational effectiveness. He noted three potential uses for the goal construct: (1) Goals are motivating factors; they serve as incentives for organizational members. (2) Goals serve as constraints on organizational decision making. That is, they provide guidelines for organizational action, channeling activities in specified directions. (3) Goals provide a set of criteria for the evaluation of selected aspects of organizational behavior and performance. Scott then focused on this third usage as a way out of the difficulties inherent in measurement of goal-attainment.

The goal approach had fallen into disfavor until recent years. However, Steers (1977) has proposed a model which contains major elements of the goal approach, combined with a modified systems approach; and Van de Ven (1977) has proposed a grounded theory approach, using aggregated individual goal perceptions as the ultimate criterion referent.

Systems Approach

The systems approach dominated the effectiveness literature until the recent introduction of integrative models. Systems models are based on the assumption that organizations are too complex to be able to define and pursue a discrete set of goals. Instead, organizations are dynamic systems striving to maintain internal stability and attempting to deal adequately with their external environment. Measurement of effectiveness involves assessment of internal stability. Subsystems exist in some state of equilibrium with one another, exchanging inputs and outputs and functioning at some level of harmony. The goal of the organization is survival without depletion of available resources. The system tries to meet the needs of its components and to export its product to the environment. Measurement of effectiveness involves assessment of: internal stability, resource acquisition and utilization, output production, accuracy of environmental characteristics, ability to respond to external feedback, and ability of the system to attain its goals. Various researchers have adopted aspects of this paradigm (i.e., Beckhard, 1969; Georgopoulos & Tannenbaum, 1957; Katz & Kahn, 1966; Likert, 1961, 1967; Mahoney & Weitzel, 1969; Mott, 1972; Spray, 1976; Yuchtman & Seashore, 1967).

Price (1972) has criticized the system approach on three grounds. First, because it has failed to adquately measure the concept of optimization of resource procurement, a concept central to the approach. Optimum utilization of resources is viewed as the point beyond which the organization begins to irreparably deplete its environment. Secondly, the use of this approach has not produced any general measures of effectiveness, i.e., external validity is very low. Most criteria are organization-specific. Thirdly, the frame of reference of the constructs is often unclear or overlaps with the domains of other constructs. Multivariate measures are used to evaluate different analytical concepts subsumed under the same heading.

Webb (1974) argued that proponents of the system model, notably Parsons (1956) and Etzioni (1960), incongruously include the concept of goal attainment in their natural systems approaches. Webb then suggested that the goal model is simply a logical extension of the systems model. This viewpoint is shared by Strasser and Deniston (1979), who found support for the hypothesis that system effectiveness is a necessary precursor to goal effectiveness. That is, only if the system is functioning adequately can the organization move toward goal attainment. Georgiou (1973) contradicted this position, viewing the natural systems approach as a sophisticated extension of the goal paradigm. Finally, Steers (1977) argued that the major problem with systems models is their abstractness, and Cunningham (1977) criticized the approach on the grounds that development of measures for all systemic needs has never been accomplished.

In summation, it would appear that the systems approach offers the clearest normative pronouncements on the nature of effectiveness. Due to the difficulties inherent in the measurement of goals, the systems model is probably easier to implement. Ultimately, however, system effectiveness may simply be a precursor to the attainment of organizational goals.

Integrative Approaches

Steers (1975) reviewed 17 models of effectiveness.[9] Since the publication of his review, a number of additional models have been proposed. A selection of these models are briefly reviewed here, both in the interest of completeness and in order to highlight emerging trends in the literature, particularly the tendency toward combination of the goal and system approaches.

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[9] Models reviewed were published from 1957 through 1975. Of these models, eight represent systems approaches and nine, the goal approaches. See also Steers (1977, p. 42-53) for a thorough discussion of these models.

Cummings (1977) presented a psychological model addressed to the individual needs of the organizational member. He defined effectiveness as the degree of perceived organizational instrumentality. Effective organizations are: (1) Those whose participants see the system as providing the greatest amount of help in the attainment of their personal goals. And (2) those whose participants see the system as providing the greatest amount of freedom to pursue their goals. Cummings thus departs from traditional criterion approaches in favor of an organization-specific model tailored to individual member needs and need satisfaction.

Evan (1976) proposed a systems-based model defining effectiveness as the capacity of the organization to cope with four systemic processes involved in the organization's attainment of its goals. These systemic processes are inputs, outputs, transformation of resources, and feedback effects. The processes are operationalized by arranging them into ratios which define the systemic process variables (i.e. Outputs ÷ Inputs, Change in Transformation ÷ Inputs, Change in Outputs ÷ Outputs, etc.). Various indicators may also then be chosen to measure the variables, depending on the type of organization (Output ÷ Input = Total number of students graduated ÷ school district budget; Change in Transformation ÷ Inputs = Change in cost of information system ÷ annual budget; Change in Outputs ÷ Outputs = Change in number of students graduated, etc.).

Reimann (1975) proposed that the focus of organizational effectiveness studies be shifted away from effectiveness (defined in the classical goal attainment sense) and toward the concept of competence. Competence relates to the propensity of the organization to achieve its goals. Rather than examine the degree of goal attainment achieved, the researcher should assess the latent ability of the organization to satisfy its members. The major independent variables in the model include a number of traditional indicators (size, dependence, structure, technology) as well as management's values with respect to the publics serviced by the organization.

Scott (1977) has made a number of contributions to the effectiveness literature. His work on the nature and uses of the goal construct has already been noted. In addition, he has broadened the systems model to include three perspectives: the rational system, the open system, and the natural system. The rational system perspective sees the organization as a means of goal attainment. Rational system criteria include productivity and efficiency. The open system model sees the organization as possessing a highly permeable boundary and as continuously engaged in system elaboration and maintenance activities. Open system criteria include adaptability, flexibility, and maximization of bargaining position. The natural system approach uses an organic model and concerns itself with both goal attainment activities and survival. Effectiveness criteria include survival, member satisfaction, morale, and profitability.

Scott has also discussed problems of assessment of effectiveness and has suggested three categories of measures: (1) Outcome measures, which examine products or results of organizational operations. (2) Process measures, which examine the quality and/or quantity of activities performed within the system. (3) Structural measures, which examine all organizational or member characteristics that may have an impact on effectiveness.

Steers (1977) has developed a model which builds upon much of the earlier research in the field. He uses a process model of effectiveness in which effectiveness is defined according to the organization's performance on a number of variables. The effective organization is one in which goal attainment is optimized, organization-environment exchanges are understood, and the needs of the employee and the needs of the organization are similar. Evaluation of effectiveness focuses on four major process variables: (1) Organizational characteristics--these include stucture and technology. (2) Environmental characteristics--including the degree of complexity, stability and uncertainty in the external environment as well as factors relevant to the internal (climate) environment. (3) Employee characteristics--including degree of organizational attachment and motivation, perceived role clarity, and abilities. (4) Managerial policies and practices--this variable examines goal setting behavior, communication processes, leadership behavior and various leader behaviors directed at enhancement of task performance. Steers' model is a process model, not an outcome one. Consequently, it does not predict generalizable end states for all organizations.

Stewart (1976) utilized the familiar Parsonian[10] functional model--goal attainment, adaptation, integration, latency--as a basis for his model of effectiveness. He then combined the functional requirements of the organization with a developmental model of organizational history.[11] Phases of growth of the organization include foundation, consolidation, operations, and goal achievement. When these phases are considered in view of the requirements for organizational maintenance and survival, a definition of effectiveness emerges: the degree to which the system moves toward acquisition, consolidation, power and goal objectives.

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[10] Parsons, 1956.

Van de Ven (1976), as has been noted, proposed a goal-attainment model utilizing aggregated individual perceptions as effectiveness indicators. Building upon Scott's (1977) analysis of the possible uses of goals: (1) to motivate members, (2) to provide direction and constrain behavior, (3) to provide criteria for evaluation of organizational functioning, he then suggests a model and a methodology for defining effectiveness. Generalizability of the effectiveness indicators is low--only organization members or decision makers are qualified to assess the organization's functioning. The suggested process of assessment is a variation on the "nominal group technique" for group decision making developed jointly by Van de Ven and Delbecq (1971).

Weick (1976) has offered a model which defines organizations as systems of minimally connected subsystems, each pursuing multiple objectives. He has argued that the concept of "organization" is one invented by humans to enable them to order the world, to capture the essence of a series of processes which actually defy encapsulation. The environment is not seen as a given. Rather, it is a result of human perception and of the accumulated outputs of the organization. Behaviors are not necessarily rational and goal directed. Instead, models postulating goal-directedness are attributed to behavior after the fact. Finally, organizations are interpersonal constructs, and, since reality is socially constructed, language and communication processes play a major part in the determination of effectiveness. After defining organizations from this phenomenological perspective, Weick then presents and defines eight new criteria for effectiveness. Organizations are: garrulous, clumsy, superstitious, hypocritical, monstrous, octopoid, wondering, and grouchy. Since definition of these terms is beyond the scope of this paper, it is probably most important to note (1) Weick's radical departure from traditional effectiveness criteria (satisfaction, flexibility, growth, etc.), and (2) his use of metaphors derived from linguistics and phenomenological sociology.

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[11] Hughes, 1958, p. 56-67.

The models reviewed in this section are significant in that they illustrate alternative ways of integrating the goal and systems approaches to the study of effectiveness. This trend, evident in much of the literature published toward the end of the 1970's, is also reflected in several attempts to totally reframe the construct. Two of these attempts are discussed in the section to follow.

Reframing Attempts

The two approaches presented here are attempts to redefine a conceptual framework for effectiveness research. Rather than organize all of the various published models under the goal- or system-rubric, they try to redefine the categories, based on various divergent themes. Several attempts at such redefinition (Campbell et al., 1974; Kirchoff, 1977; Pennings & Goodman, 1977; Steers, 1977) are not reviewed here because they represent somewhat limited integrative approaches. That is, they all accepted either the goal or system dichotomy and then incorporated a small number of concepts to make the basic approach more complete.[12]

Cunningham (1977) has proposed a seven-category framework for the classification of effectiveness models. Two of his categories, the rational goal, and the systems resource, are basically the traditional ones, with minor additions/deletions. The other five are expanded categories, either reclassifying earlier studies or adding previously uncategorized material.

(A) Rational Goal Model. This model is similar to the traditional goal-attainment approach. The focus of effectiveness evaluation is in the ability of the organization to achieve its goals. Examples of the goal model include Perrow (1961) and Price (1968).[13]

(B) Systems Resource Model. This is the traditional systems approach, with the addition of the goal optimization perspective advocated by Steers (1977). The focus of evaluation is on (1) the efficiency the organization exhibits in optimizing its resources; and (2) the amount of items produced as subsystem needs are met or not met. Examples of the model include Georgopoulos and Tannenbaum (1957) and Yuchtman and Seashore (1967).

(C) Managerial Process Model. This model defines effectiveness in terms of the organization's performance on basic managerial functions, such as budgeting, planning, decision making, etc. The work of Cyert and March (1963) is illustrative of this model.

(D) Organization Development (OD) Model. Effectiveness is defined as the ability of the organization to effectively use and maintain its human resources. The focus of evaluation of effectiveness is upon processes such as support, trust, communication, leadership, and satisfaction. Examples of the OD model include Beckhard (1969); Bennis (1969); Lawrence and Lorsch (1969); Likert (1961, 1967); and McGregor (1960).

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[12] The Pennings and Goodman (1977) framework is the most ambitious attempt at synthesis, including virtually all the major models in the field. It continues to advocate the goal-systems dichotomy, however.

[13] Examples of models included in the various categories represent only those actually included by Cunningham. Many important models are missing from his review.

(E) Bargaining Model. This model defines effectiveness in terms of the organization's exchange relations. Subsystems are seen as in continual competition for scarce resources. The focus of evaluation is upon the allocation of resources by decision makers. Each new organization problem requires a different allocation of resources. The effective organization is one in which resources are efficiently utilized. Examples of the bargaining model include Barnard (1938) and Georgiou (1973).

(F) Structural Functional Model. In this model, effective organizations are those that develop structures that maximize: the organization's security, stability of formal authority, stability of informal communication, continuity of policy-making, and homogeneity of world view. The focus of evaluation is upon the adequacy of the organization's structures to provide for system maintenance and continuity. Examples of this model include Selznick (1948, 1949).

(G) Functional Model. This model defines effectiveness in terms of the ability of the organization to benefit society. The focus of effectiveness evaluation is upon the degree to which the system meets the needs of its various client groups. The model is based on the work of Parsons (1956, 1960) and includes evaluations of the goal attainment, adaptability, integration, and pattern maintenance functions. Examples of the model include Fremont (1975) and Mitchell (1958).

After defining his categories, Cunningham then discussed the utility of each in relation to organizational presses and situational needs. He recommended a contingency approach to the evaluation of effectiveness that includes various blends of the models and of the model users (researchers, managers, etc.).

Generally, the classificatory scheme is rather well thought out, although there is a good deal of overlap between categories, especially between: managerial process and OD, managerial process and bargaining, and structural-functional and functional. Also, a significant number of existing models were not incorporated into the classification. The strength of this attempt at creating a taxonomy of effectiveness models lies in its advocacy of the contingency approach to measurement. It avoids the usual debate over which model is the correct effectiveness model by letting the selection of model be dictated by the information needs of managers or researchers.

Kilmann and Herden (1976) have developed an integrative model of effectiveness in conjunction with their work on the evaluation of OD. They see the improvement of organizational effectiveness as the ultimate goal of all OD interventions. Their model is grounded in the Jungian typology,[14] and addresses the way the evaluator of effectiveness perceives the organization and the decision situation. Application of the typology to the study of effectiveness produces a four-celled model.

(A) Internal Efficiency. Internal efficiency is defined as the degree to which the organization maximizes its ratio of outputs to inputs (i.e., productivity). The efficient organization converts inputs to outputs at the lowest possible cost through optimal allocation of tasks and division of labor. This model is similar to the Systems Resource model of Cunningham. Mott (1972) is presented as an example of this model.

(B) External Efficiency. External efficiency is defined as the maximization of the bargaining position of the organization in its exchange relations with the environment. The efficient organization is able to secure for itself, from the environment, the needed amount of scarce resources. This model resembles both the Systems Resource and the Bargaining models of Cunningham. The Yuchtman and Seashore (1957) and Lawrence and Lorsch (1967) models are mentioned as examples of the external efficiency approach.

(C) Internal Effectiveness. Internal effectiveness is defined as the maximization of member motivation and commitment to task performance. Internal effectiveness is also concerned with the interpersonal process and relationships necessary to a high degree of task performance. The effective organization provides individuals with the capability to meet high valence personal goals. This model has no direct counterpart in Cunningham's typology, but is exemplified in the work of Porter and Lawler (1968) and Vroom (1964).

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[14] Jung, 1923.

(D) External Effectiveness. External effectiveness is defined as the degree to which societal satisfaction is maximized. The effective organization is one which is able to satisfy the needs and demands of competing subgroups in the environment. This is similar to Cunningham's functional approach and may be illustrated by the "organizational success" model of Pickle and Friedlander (1967).

Overall organizational effectiveness is a multiplicative function of each of the four cells (Internal Efficiency x Internal Effectiveness x External Efficiency x External Effectiveness). The effective organization is thus one in which highly motivated individuals perform efficiently structured and organized tasks. Regarding its relations with the environment, the effective organization obtains needed resources and distributes them efficiently. It also meets the needs of its clients and other interested parties in society.

Following the development of their model, Kilmann and Herden examine the impact of change interventions on some hypothetical organizations and discuss general ways of evaluating effectiveness. This model suffers, as did the Cunningham typology, from inclusion of only a fraction of the published models of effectiveness. It does offer, however, a novel approach to the examination of the character of the evaluator of effectiveness, and it makes some predictions about the ways evaluation of effectiveness will be approached by each Jungian personality type.

This brief review of thinking relative to organizational effectiveness illustrates the definitive characteristic of the literature: theoretical pluralism. The number of available models and taxonomic frameworks has increased markedly in the last 20 years. Social scientists looking for elegant macro-theory will not find it in the literature on effectiveness. One result of this situation is that, after a given model is proposed by its author and placed in relation to other theories, it is often reinterpreted and reclassified by other researchers using other typologies. The Likert model of effectiveness, for example, has variously been cited as a systems model (Campbell et al., 1974); an organization development model (Cunningham, 1977); an example of the supportiveness construct (Webb, 1976); an example of the climate construct (Steers, 1977); and as an example of management style (Reimann, 1975).

Criterion Measures of Effectiveness

All approaches to the study of organizational effectiveness propose and evaluate performance on various criteria of effectiveness. These criteria derive from the conceptual scheme of the researcher and represent the operationalization of the investigator's particular theory or theoretical approach. When performance along the dimensions represented by the criteria is measured, an evaluation of effectiveness can be made. These criteria are the dependent variables of effectiveness research.[15]

Campbell et al. (1974) have noted that practically every dependent variable ever studied in the field of organization behavior has been operationalized as an effectiveness criterion. Given the problem of theoretical pluralism mentioned above, this comes as no surprise. Campbell and his colleagues reviewed the literature on effectiveness and gleaned 26 dependent variables which were grounded in empirical work and used either the organization or the work group as the unit of analysis. Later updating of this work (Campbell, 1977) yielded an additional four variables. A summary of these variables is presented in Table 2.1. Examination of the table reveals that potential criteria range from the univariate (Overall Effectiveness), through global measures (Job Satisfaction, Morale, Productivity), to the relatively specific (Absenteeism, Planning and Goal Setting, Turnover).

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[15] See Smith, 1976, for an excellent discussion of the criterion problem in industrial and organizational psychology.

TABLE 2.1

DEPENDENT VARIABLES OF ORGANIZATIONAL EFFECTIVENESS RESEARCH

Absenteeism
Achievement Emphasis
Accidents
Conflict/Cohesion
Control
Efficiency
Evaluation by External Entities
Flexibility/Adaptation
Goal Consensus
Growth
Information Management & Communication
Internalization of Organizational Goals
Job Satisfaction
Managerial Interpersonal Skills
Managerial Task Skills
Morale
Motivation
Overall Effectiveness
Participation & Shared Influence
Planning & Goal Setting
Profit
Quality
Readiness
Role & Norm Congruence
Stability
Training & Development Emphasis
Turnover
Utlization of Environment
Value of Human Resources

Note: The variables in Table 2.1 are adapted from Campbell, 1977, p. 36-39.

Steers (1975) offered a similar list, containing 15 criteria, after his review of 17 models of effectiveness. He found only one criteria, Adaptability/Flexibility, to be represented in over 50% of the models.

Numerous criteria may be operationalized in one model as well. Dyer and Hoffenberg (1975), for instance, derived their criteria set of 40 items from an initial literature search yielding 56 possible criteria, clustering into four broad categories.

To date there seems to be little agreement on appropriate measurement criteria. Or, to put it another way, appropriateness of criteria is totally dependent on (A) the model specified and (B) the nature of the organizational processes and outcomes to be evaluated.[16] These points are reinforced when one realizes that these dependent variables have often been operationalized as independent variables. Campbell et al. (1974) also discussed this problem and presented a listing of these independent variables. An extensively modified version of their compendium is presented in Table 2.2.

A comparison of Tables 2.1 and 2.2 reveals many of the same concepts defined in different terms. The plethora of available criteria gives rise to several areas of concern, relative to the measurement of effectiveness.

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[16] Leitch (1968, p. 297) offers a third interpretation: "Organizational effectiveness depends upon whom we ask to define the concept. This is equivalent perhaps to arguing that the state of an organization's 'effectiveness' is largely dependent upon individual perceptions and judgements."

TABLE 2.2

INDEPENDENT VARIABLES OF ORGANIZATIONAL EFFECTIVENESS RESEARCH

- Participation in Decision-Making
- Personnel Practices
  - Personnel selection
  - Personnel classification
  - Career assessment and development
  - Individual counseling
- Training
  - Skill training
  - Management and executive development
  - Managerial interpersonal skills
  - Human relations training
  - Communication skills training
- Reward Systems
  - Changes in promotional criteria
  - Contingency pay
  - Cafeteria pay plans
- Human-Process Organization Development Methods
  - Organizational behavior modification
  - Survey feedback
  - Laboratory training
  - Conflict resolution intervention
  - Process observation and feedback
  - Team building
- Techno-Structural Organization Development Methods
  - Job design
  - Flexible scheduling
  - Job enlargement
  - Job enrichment
  - Socio-technical system design
  - Quality of work life approach
- Changes in Organizational Structure
  - Changes in functional relations
  - Matrix management
  - Management by objectives
  - Autonomous work groups
- Changes in Control Systems
  - Program Planning and Budgeting System (PPBS)
  - Zero-Base Budgeting (ZBB)
  - Management information systems
  - Business communication practices
  - Manpower planning techniques
  - Strategic planning techniques
  - Operations research
- Advances in Technology

Note: The variables in Table 2.2 are adapted from Campbell et al., 1974, p. 221-222.

Nature of the Construct

Criteria themselves fit into classification schemes. Four descriptive continua are most often represented in the effectiveness literature: internal vs. external; hard vs. soft; nonindependent vs. independent; and univariate vs. multivariate. Armenakis and Feild (1975) provide an excellent discussion of criteria and define internal criteria as those minimally influenced by external environmental change (e.g., goal consensus). External criteria are those that are more responsive to such changes (e.g., growth, profit).

Hard criteria are those which may be readily quantified (e.g., absentee or turnover rates), whereas soft criteria are more subjective (e.g., flexibility). Hard criteria have greater face validity and reliability, however, soft criteria may have greater overall validity. Hard criteria are generally easier to measure using quantitative methods.

Non-independent criteria are those whose measurement is not totally independent of other criteria previously measured. Motivation is a non-independent measure which can vary as a result of employee characteristics, organizational instrumentality, or peer relations. Independent measures are those which are not affected by other measures. At the present time, our knowledge of organizations is too limited to be able to identify any independent criteria.

Closely related to the independent/non-independent classification is the univariate/multivariate concept. Univariate effectiveness models are those which propose one ultimate criterion for measurement. Those most often used have been overall performance, productivity, satisfaction, profit, and withdrawal (Steers, 1975). Univariate models are useful for research purposes but do not adequately reflect the complexities of organizational systems. As a result, multivariate models of effectiveness are most often specified in the recent literature.

Criterion Deficiency

Many facets of organizational life do not lend themselves to measurement. Given the limited state of our knowledge about processes such as work group dynamics, or the interaction of physical settings and individual characteristics, accurate measures of these processes are often difficult to devise. In addition, precision measurement of certain constructs may be impossible. A percent-of-change index of turnover may appear valid, but the scale might actually contain large inherent error. Another dimension of the problem relates to measurement precision. It may be that the use of a percent-change index of turnover as an indicator of performance will falsely demonstrate more of a capability for precision than we actually possess. Large measurement error may be built in, and reliance on such indices for evaluation of effectiveness may result in unreliable outcome measures.

Construct Validity

Many of the proposed effectiveness criteria have either demonstrated little inter-index correlation, or they fail to be similarly affected by coterminant external factors. Satisfaction and productivity, for instance, have been used as univariate effectiveness criteria, yet research remains equivocal as to the nature of the relationship between the two (Porter & Lawler, 1968; Vroom, 1964). Two measures of the same construct must have some discernible relationship to one another. If they do not, either the construct is faulty or we simply do not understand enough about it to select the relevant observable criteria. If either be the case the validity of the construct is in question.

Criterion Stability

Many criteria are unstable over time. A criterion which may adequately measure a facet of organizational life at one point may become invalid at a later date.

Multiple Criteria

The use of multiple criterion measures may result in confusion and inaccuracy of measurement when the criteria are in conflict with one another. For example, high return on investment and significant contribution to societal needs may be in conflict. An industrial organization may increase its profits in the short run at the expense of the greater social good by continuing to use inexpensive processes which pollute the environment. When an increase on one criterion results in a decrease on another, it becomes very difficult to measure effectiveness.

Criterion Generalizability

The generalizability of criteria across organizations is questionable. Criteria that are applicable to profit-making organizations, for instance, may not be useful in schools. Criteria arising from a particular model of reality and based on organization-specific values and goals may not be valid measurement devices in other settings.

Comparison Over Time

It is often difficult to determine exactly when to measure change efforts. Results of intervention programs may be invisible in the short run, taking years to surface. Likert and Bowers (1969) have written extensively about this problem and conclude that the length of the time lag is dependent on organizational size, type of work, and organizational complexity. Several of the effectiveness models examined by Steers

(1975) have attempted to address this problem. One of these (Gibson, Ivancevich, & Donnelly, 1973) suggests that different criteria be used in the short run (productivity, efficiency, satisfaction), in the intermediate run (adaptiveness, development), and in the long run (survival).

Usage

A final noteworthy trend in the literature is the move toward specification of one set of effectiveness criteria for theoretical purposes and another for application (Cunningham, 1977; Spray, 1976; Strasser & Deniston, 1979). Organization researchers are often involved in comparative studies, with the organization or subsystem as the unit of analysis. Criteria for these purposes are usually those that lend themselves to relatively sophisticated quantitative analysis. Organizational managers, on the other hand, are seeking information for decision making, and various groups external to the organization may be seeking information for accountability, evaluation of social utility or other purposes.

In addressing this trend Campbell (1977) has urged that both the model and the criteria of effectiveness be tailored to: (1) the needs of the organization; (2) the needs of managers; (3) the type of organization; (4) the purpose of the study; (5) the values of the user, and (6) the factors of organizational life.

In referring to external evaluators of effectiveness, Scott (1977) suggested that the evaluator must first determine the actual client group, then tailor the criteria appropriately. Different interest groups prefer different types of evaluation measures, based on the amount of control each group believes it has over the output to be measured.

Thus, clients of the organization prefer outcome measures (i.e., parents and college admissions deans want student performance data). Rank and file organization members prefer process measures (i.e., teachers need to know how well they are conforming to state curriculum guidelines). Organizational managers prefer measures of structure (i.e., superintendents want to know how much money the new district reorganization is saving the system). Lastly, the organization's public prefers measures of macro-quality (i.e., are the schools producing well-educated citizens, able to blend into the mainstream of community life?).

Methodological and Conceptual Problems in the Study of Organizational Effectiveness

At least four major problem areas have been identified in the literature on organizational effectivess. These problem areas, along with some suggested solutions, are presented here.

Definition of the Construct

Many researchers have suggested their own a-priori constructs (Georgopoulos & Tannenbaum, 1957). Often, these constructs are not grounded in specific organizations, but represent operationalization of a particular model. Specification and testing of a particular model can result in a narrowly defined set of operationalized variables (Kirchoff, 1977). Sometimes criteria are proposed which deal only with specific facets of the organization, such as its internal dynamics (Friedlander & Pickle, 1968); support systems (Webb, 1976); managerial value set (Reimann, 1975); or ability to generate member creativity (Schein, 1970). In addition, the search for a univariate construct, now for the most part abandoned, led researchers into various time- and energy-consuming cul-de-sacs (Mahoney & Weitzel, 1969; Smith, 1976). Finally, the historical primacy of the goal paradigm, and the concomitant emphasis on development of measures of goal attainment, has retarded understanding of the concept (Hannan & Freeman, 1977). Goals are usually vaguely defined by the organization, are defined differently by different subsystems, or are not tied to any indicators of attainment (Georgiou, 1973). All of the problems with the construct itself have resulted in low generalizability of specified models from one organization to another (Campbell, 1974; Steers, 1975). Whether or not generalizability across organizations is possible or necessary remains to be determined. Only comparative studies, utilizing the organization as the unit of analysis, can provide insight into this problem (Campbell, 1974; Pfeffer, 1977).

Conceptual Clarity

The criterion problem has already been addressed. It is important to reinforce the fact that the distinction between the determinants of effectiveness (the independent variables) and the criteria of effectiveness (the dependent variables) has often been blurred (Hannan & Freeman, 1977; Goodman & Pennings, 1977). This has resulted in a good deal of confusion as to the causal nature of the various criteria.

Perrow (1977) has suggested that this conceptual fuzziness is endemic to variable analysis (if Y is an organizational goal, such as productivity, and X is a presumed cause of Y, such as supervisory style, variable analysis could examine the question: What is the impact of System IV management style [X] upon productivity [Y]?). Perrow proposes two alternatives to variable analysis: gross malfunctioning analysis and revelatory analysis. Gross malfunctioning analysis would examine successful businesses in comparison to those filing for bankruptcy, permissive persons in comparison to brutal ones, or schools with exceptionally high achievement scores to schools at the other end of the continuum. He argued that these types of exploration have traditionally been left to yellow journalists, consumer advocates or investigatory commissions. Social scientists have concentrated instead on "best case analysis," attempting to explain narrow ranges of difference at the upper reaches of the scale. If gross malfunctioning analysis be perceived as too radical, Perrow offers revelatory analysis as an alternative. Revelatory analysis asks "effectiveness for whom?" It seeks to discover intended consumers of organizational output and then tries to find out exactly what they are receiving.[17] If enough constituencies are receiving adequate compensation, in whatever form, the organization would be considered effective.

Constituencies

Effectiveness research has various clients, be they managers, rank and file members of the organization, the public, or social scientists. Each constituency requires a different perspective on the issues. There is a danger that effectiveness research could be stereotyped as a management tool, reflective only of management's values (Georgopoulos & Tannenbaum, 1957), or that only society's good should be considered, at the expense of that of the organization (Goodman & Pennings, 1977). The client(s) must be identified and, if necessary, multiple criteria need to be specified to meet varying demands for information (Deniston & Strasser, 1979; Scott, 1977). This approach requires that appropriate levels of assessment (organization, subsystem, individual) be ascertained and utilized. If multiple criteria are to be specified, and if the unit of analysis is the organization, multivariate analytic procedures will have to be employed (Cummings, 1977).[18]

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[17] This approach is similar in many respects to Scriven's (1972) goal-free approach to evaluation, where both intended and unintended consumers are polled. Evaluation is based upon judgments of the utility of what is actually produced, rather than upon how close the fit between goal and output.

Time Perspective

Time periods need to be established for the evaluation of effectiveness. Different criteria will be applicable in the short, intermediate, and long run (Gibson et al., 1973). Criteria must be specified so that time lags between organizational cause and effect are considered (Pennings & Goodman, 1977; Scott, 1977).

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[18] This position is refuted by Campbell (1976, 43), who appears to base at least part of his counter-argument upon financial and convenience considerations: "...it is clear that the cause and effect relationships, or even the patterns of covariation among different variables, cannot be determined by massive studies that cover many organizations and rely on multivariate analysis. A few people with good hearts and superhuman effort have tried such strategies, most notably those at Michigan (e.g., Franklin, 1974), but the payoff has been depressingly small and difficult to interpret." Campbell then goes on to suggest in-depth case studies and/or thorough simulation studies as possible alternative methodological approaches. See also Van de Ven (1976) for a discussion of a grounded theory approach to the study of effectiveness.

THE LIKERT APPROACH TO THE STUDY OF EFFECTIVENESS

This section examines both the theoretical and empirical bases of the Likert approach. Due to the volume of data relevant to the model, this review will be a cursory one. Additional theoretical material will be provided, however, in later chapters as it becomes pertinent to the discussion.

The model of organizational effectiveness originally developed by Likert (1961, 1967) and his colleagues at the University of Michigan has been chosen as the conceptual focus of the present study. This model was chosen for several reasons. First, Likert's theory has been formulated in conjunction with a large and growing data base, and is, therefore, more empirically grounded than many other systems models. Secondly, IDEA's survey items were built with some of Likert's concepts in mind. Consequently, some degree of fit between available data and substantive requirements already exist. Thirdly, one of the few examples of the application of path-analytic techniques to organizational theory was based on several of Likert's theoretical concepts (Franklin, 1973, 1975a, b). It was hoped that this earlier attempt at causal modeling could both provide valuble insight into practical research problems and, more importantly, serve as a touchstone for comparison of the results of the present study. Finally, Likert's model was composed of discrete variables which appeared to lend themselves well to the statistical methodology (structural equation modeling) under consideration for the actual analysis of the model.

The model represents a systems approach to the study of effectiveness, although it has also been classified as an organization development approach (Cunningham, 1977); as a normative pronouncement on managerial style (Reimann, 1975); and as an example of a work restructuring approach to the enhancement of effectiveness (Pennings & Goodman, 1977). The model was originally proposed in 1961 and has undergone extensive refinement and reformulation in the years since its presentation.

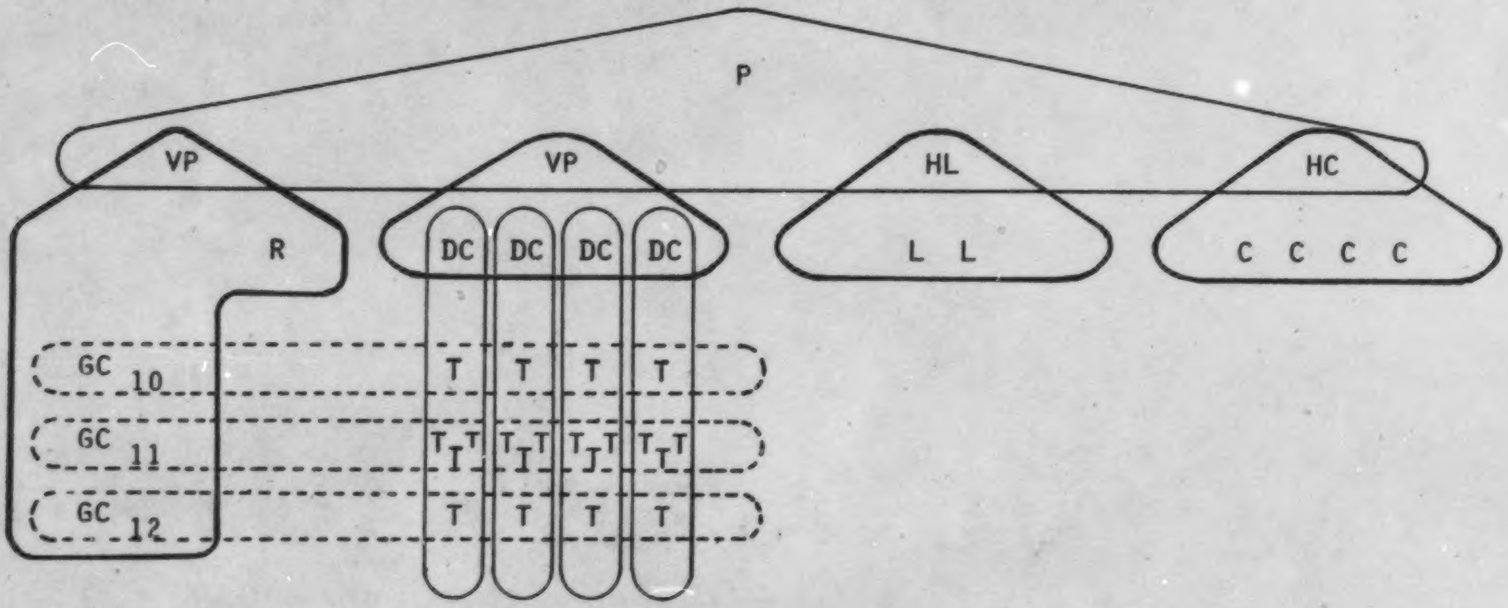
Perhaps the major theoretical factor distinguishing this model from others is its emphasis on the concept of participative decision making. Based on the work of Coch and French (1948), the idea is that the most effective work groups are those where power is shared. Likert believes that shared power and shared decision making are central to the satisfaction of human needs for control over life choices. He views these concepts as nearly universal human values, and has suggested that they should be recognized as legitimate human rights (Likert & Likert, 1976, p. 1). As applied to organizations, participation involves several core processes (Bowers, 1976). These include: (1) Supervision is anchored in the work group. It is a function of both the task content and the group process operating within the work team. (2) Information flows freely in all directions--horizontally as well as vertically. Communication may be initiated by any party involved in the transaction. (3) All work group members may influence decisions which may later impact them. Decisions are reached by consensus, with all group members contributing to the best of their ability. To the extent that subordinates are involved in decisions affecting them, the organization will be effective in maximizing its output.

The concept of participative decision making implies an organizational structure designed to optimize synergistic decision processes while still providing needed control mechanisms. Likert has discussed such structural implications as specifically applied to schools (Likert & Likert, 1976, p. 217-242). A simplified version of the ideal structure for secondary schools is presented in Figure 2.1. As the figure shows, the top management team is small, being limited to the principal, vice principals, head librarian and counselor. Likert believes the most effective work groups are small face-to-face groups utilizing consensus as their primary decision process. Large numbers obviously limit "air time" and lengthen the time required to reach decisions. Groups overlap with one another, so that certain personnel are members of two groups simultaneously. These persons serve as "link pins" between the upper group (where they are subordinate) and the lower group (where they are the superior). Work groups are usually larger at the bottom of the organization than at the top, although this is not always the ideal case. Finally, the typical structure is also a matrix. Thus, a teacher will be simultaneously a member of a subject matter department and of a grade level team.

Figure 2.1 represents the ideal case. Unfortunately, most schools today are structured rather differently. The work group of the average school is composed essentially of the principal and the remainder of the staff (Likert & Likert, 1976). Faculty meetings are governed by par-

FIGURE 2.1

SIMPLIFIED STRUCTURE FOR PARTICIPATIVE SECONDARY SCHOOLS


P
VP
VP
HL
HC
R
DC
DC
DC
DC
L L
C C C C
GC 10
GC 11
GC 12
T T T T
T T T T T T T T T T T T
T T T T

P = Principal
VP = Vice Principal
HL = Head Librarian
HC = Head Counselor
R = Registrar
DC = Department Chairperson
L = Librarian
C = Counselor
GC = Grade Chairperson
T = Teacher

Note: Adapted from Likert and Likert, 1976.

liamentary procedures and not by concepts of creative problem solving. Such a structure is representative of the System 2 organization, about which more will be said shortly.

A central organizing principle of the Likert theory is the Causal-Intervening-End Result dimension of social system analysis. Likert has proposed that all the variables related to the definition of organizational effectiveness can be apportioned into these three categories:

(1) Causal variables are those which are modifiable by the leadership of the organization. These variables influence all of the activity which occurs internal to the system, as well as influencing the organization's outputs, whatever they may be. Causal variables are the independent variables of effectiveness research. Included in this category are organizational structure, managerial goals, policies and strategies, leadership style, skills and behavior, and organizational climate.

(2) Intervening variables are the mediator variables of effectiveness research. Represented here are concepts relating to the internal state and health of the organization. These variables include communication processes, internal decision-making practices, individual member goals, attitudes, perceptions and motivations, and interpersonal relations among staff members.

(3) End-Result variables are the dependent variables and represent organizational outputs. These outputs can include member satisfaction, productivity, cost, or any other "hard" performance data.

These organizing principles obviously lend themselves to empirical research. Indeed, one of the identifying characteristics of the Likert/ISR approach is the quantitative survey. Two slightly different survey packages have been developed. The first of these, the Survey of Organizations (SOO), was originally designed for use as a measurement device for the Intercompany Longitudinal Study (Bowers, 1973). The

SOO is a standardized instrument package which has been administered in various forms since 1966 to over 20,000 managers and 200,000 employees in hundreds of organizations (Taylor & Bowers, 1972).

The second version of the Likert theory, the Profile of Schools (POS), was developed specifically for use in educational systems. It was believed that the same concepts could be applied to educational organizations as were being applied in the private sector. Certain slight theoretical and technical modifications were required, however, to fit the characteristics of these systems. The POS was field tested from 1969 through 1971 and was first administered during the 1971-1972 school year. Like the SOO, the POS has undergone a number of revisions, with the latest version being implemented during 1978-1979 (Rensis Likert Associates, 1978).

The remainder of the discussion of the Likert model will focus on the model as modified for use in schools. The SOO and POS are quite similar, but there are some minor definitional and structural variations.

Causal Variables

The two causal variables impacting the organizational life of schools are Organizational Climate and Supervisory Leader Behavior.

Organizational Climate

The climate construct describes the general tone of administrative activity occurring within any individual school that exists as part of a larger school system. This tone is set by the policies, procedures and expectations developed for the school by the superintendent, school boards and other top administrative groups. In order to understand

Likert's conceptualization of climate it is important to realize that he perceives work group climate to be a function of level in the organizational hierarchy. Upper management (superintendent, etc.) sets standards and policy and exhibits certain leadership behavior--all of which set the organization's climate. Middle managers (principals, etc.) receive the climate as an input into their individual subsystems. They then exhibit their own leadership behavior, define structure and make policy--all within the constraints as imposed from above. This continues down the hierarchy of the school, to department heads, grade chairpersons, etc. As operationalized in the POS, the climate variable measures: (a) the quality of decision making practices within the school; (b) the extent of commitment to the goals espoused by the school; and (c) the amount of perceived cooperation and support between and among various departments.

Climate is seen as a collection of practices or actions, not as a measure of emotional feelings or of the social environment of the organization. Likert's usage of the climate construct parallels that of Hemphill and Westie (1950), House and Rizzo (1972), Litwin and Stringer (1968), Schneider and Bartlett (1970), and Tagiuri (1968).

Supervisory Leader Behavior

The behavior of the principal toward the teaching staff impacts not only the organizational climate, but also affects other areas of the organization. Likert defined five major areas in which leader behavior may impact organizational effectiveness.[19]

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[19] Rensis Likert Associates, 1978, p. IV-3 through IV-5.

(A) Leader Support: This variable measures the extent to which the principal helps to increase feelings of self worth and importance among the school staff. It also examines subordinates' perceptions of the amount of trust the principal has in them; how receptive the principal is to their job-related suggestions; and the degree to which the principal allows the staff to participate in making decisions which directly affect them.

(B) Goal Emphasis: This variable measures the amount of task-oriented behavior exhibited by the principal (as contrasted to Leader Support, which measures "people" orientation).

(C) Team Building: This variable examines the degree to which the principal encourages the staff to use group problem solving methods.

(D) Work Facilitation: This variable examines the amount of help the principal offers the staff in findings ways to enrich their jobs or increase their level of performance. It measures the amount of useful information the principal offers, how well the principal provides needed resources; and how well the planning process is carried out.

(E) Technical Competence: This variable is similar to French and Raven's (1959) "expert" base of power in organizations. It measures the amount of perceived skill the principal exhibits in performing administrative as well as educational duties.

Intervening Variables

There are three primary mediating influences on the impact of climate and leadership upon the end-result variables. These are Team Interaction, Mutual Trust, and Peer Behavior. In addition, there are several other mediators, including level of staff motivation, amount of perceived influence, and student acceptance of the goals of the school.

Team Interaction

This variable is concerned with the way teachers function as members of work groups. It examines team functioning in five major areas:

(A) Communications; Adequate and accurate communications are required if good decisions are to be made and effectively implemented. Several aspects of communication are important. These include:

  (a) Openness of Communication: This variable measures the amount of willingness the subordinate expresses in talking to the principal about job related matters. It also examines the general tone of superior-subordinate communications and how much the subordinate trusts and relies on the information passed on by the leader.

  (b) Direction of Information Flow: This variable records the initiator of job-related information exchanges.

  (c) Accuracy of Upward Information: This variable examines the extent to which the leader receives accurate information about school-related matters.

  (d) Peer Communications: This variable measures the perceived accuracy of lateral information exchange occurring between teachers.

(B) Decision Process: This variable examines how willing the staff are to direct their own activities and to participate in decisions which are of concern to the organization.

(C) Influence Sharing: This variable examines the amount of influence teachers feel over decisions made within the school.

(D) Goal Commitment: This variable measures the degree to which teachers understand and are committed to the goals of the school. It is believed that some level of acceptance is necessary if the staff is to function well as a team.

(E) Team Cooperation: This variable measures the cohesion of the staff as indicated by the extent to which teachers are willing to cooperate with one another in routine tasks.

Mutual Trust

The amount of perceived trust existing between the staff and the principal may be a good indicator of the health of the organization. This variable has both causal and intervening components. In the former sense, the leader can increase the level of trust by behaving in ways which show subordinates that the principal has confidence in their abilities. Mutual trust is an intervening variable in that some degree of trust is necessary in order for the staff to take the principal's directions, suggestions, etc., and put them into practice.

Peer Behavior

Just as the principal may exhibit leadership behavior toward the school staff, the teachers may do the same among themselves. Likert believed that this peer supervisory behavior served an important function in transforming the organizational climate and the wishes of the leader into organizational outputs. The Peer Behavior variable measures four of the same concepts that are included in the Supervisory Leader Behavior construct:

(A) Peer Support: This variable meaures the extent to which teachers help to increase their own feelings of self worth and importance. It also examines the level of trust teachers have in one another; how receptive their peers are to their job-related suggestions; and the degree to which the staff urge one another to participate in the decision making process.

(B) Goal Emphasis: This variable measures the amount of task-oriented behavior the teachers exhibit toward one another.

(C) Peer Team Building: This variable examines the degree to which teachers support the use of group problem solving methods.

(D) Work Facilitation: This variable examines the amount of help which staff members offer one another in finding ways to enrich their jobs or increase their level of performance. It measures the amount of useful information teachers offer; the degree to which teachers share resources with their peers; and how much teachers participate in the planning of school-related tasks.

End-Result Variables

There are two major end-result variables: Educational Performance and Staff Satisfaction. These variables represent the output of the school as a social system. The effective organization will have both a record of good performance, as measured by various hard criteria, and a high level of perceived staff satisfaction.

Educational Performance

The level of performance of the school is measured by various, relatively objective, criteria. Such criteria can include student absenteeism and drop-out rates, teacher absenteeism and turnover, labor/management relations, vandalism, cost-performance measures, and the level of educational attainment as represented by student achievement data.

Staff Satisfaction

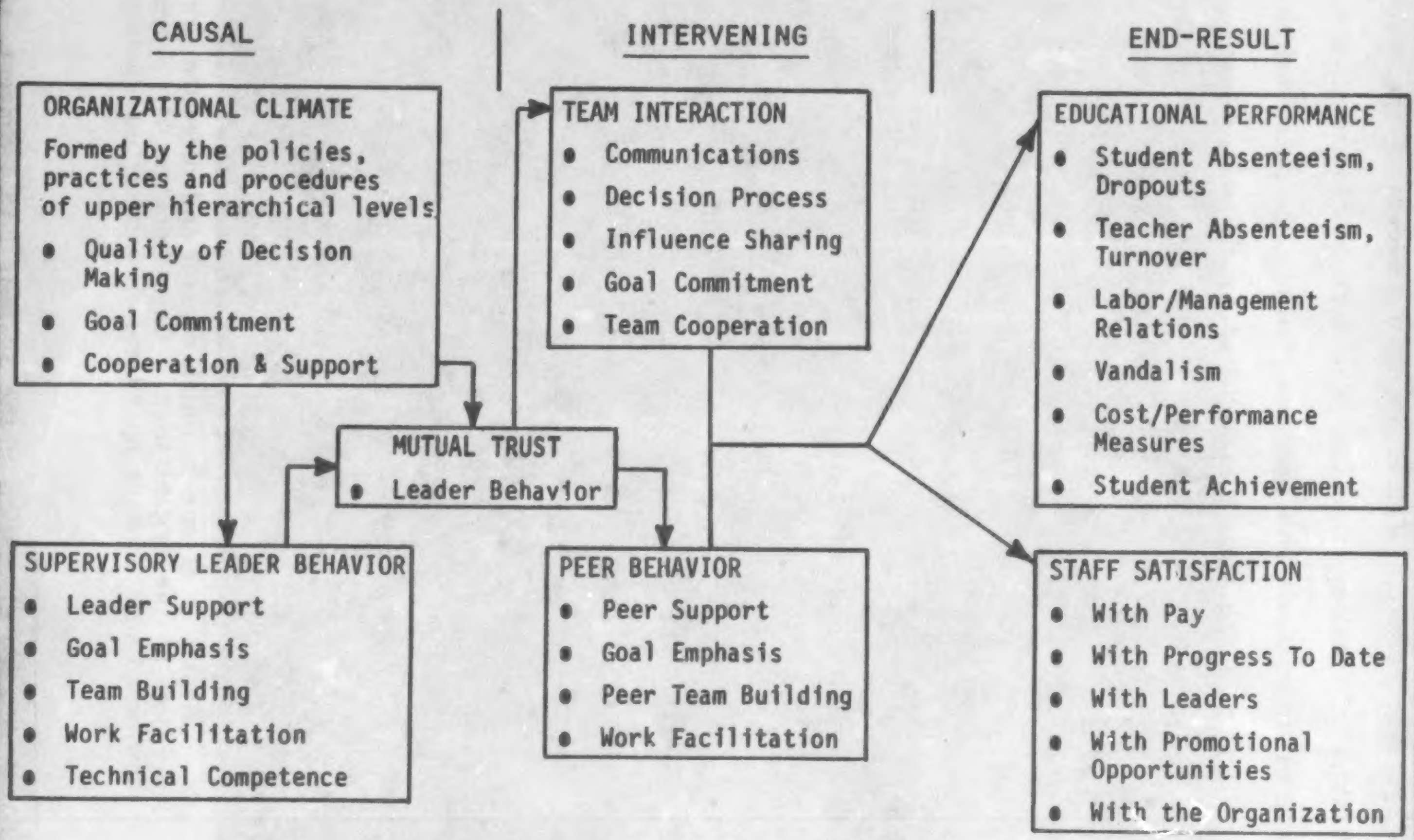
The level of teacher satisfaction with the organization may be examined in several areas. These include satisfaction with pay, with progress in the organization, with the school leadership, with other teachers, with promotional opportunity, and with the organization in general.

For purposes of clarity, the relationships among the causal, intervening and end-result variables may be pictorially represented. This has been done in Figure 2.2

As the figure shows, climate is the primary causal variable and is composed of structures, policies and leadership behaviors of superordinant levels of the school system hierarchy. These eventually filter down to the level of the individual school and become important causes of all other internal behavior. Leadership is also a causal variable made up of behaviors on the part of the school principal directed towards task accomplishment. Trust is both causal and intervening in the sense that

FIGURE 2.2

THE LIKERT MODEL OF ORGANIZATIONAL EFFECTIVENESS IN THE SCHOOL


CAUSAL
INTERVENING
END-RESULT
ORGANIZATIONAL CLIMATE
Formed by the policies, practices and procedures of upper hierarchical levels
• Quality of Decision Making
• Goal Commitment
• Cooperation & Support
MUTUAL TRUST
• Leader Behavior
SUPERVISORY LEADER BEHAVIOR
• Leader Support
• Goal Emphasis
• Team Building
• Work Facilitation
• Technical Competence
TEAM INTERACTION
• Communications
• Decision Process
• Influence Sharing
• Goal Commitment
• Team Cooperation
PEER BEHAVIOR
• Peer Support
• Goal Emphasis
• Peer Team Building
• Work Facilitation
EDUCATIONAL PERFORMANCE
• Student Absenteeism, Dropouts
• Teacher Absenteeism, Turnover
• Labor/Management Relations
• Vandalism
• Cost/Performance Measures
• Student Achievement
STAFF SATISFACTION
• With Pay
• With Progress To Date
• With Leaders
• With Promotional Opportunities
• With the Organization

it is built from the causal actions of the leader and the residual effects of systemic climate. Trust, in turn, moderates the effects of these variables and helps shape the peer work environment, which is defined by team interactions and peer behaviors. The peer work environment is a reflection of the climate established by the upper levels of the organizational hierarchy. Satisfaction and performance are the end-result variables, and represent, respectively, the aggregated level of teacher satisfaction with the school as an organization and the degree to which the school is successfully accomplishing its educational tasks. The relationship between satisfaction and performance is unclear, so no formal relationship between the two is indicated, although some degree of correlation is to be expected.

Managerial Systems

Likert has suggested a taxonomic scheme for the classification of organizations according to the type of managerial system they employ. He calls this the Systems 1 to 4 concept.[20] He believes that all organizations have managerial systems which may be placed on the continuum from System 1 (Exploitative, Authoritative) to System 4 (Participative Group). The characteristics of each of the systems will be briefly described below.

> System 1: Exploitative, Authoritative
>
> System 1 is one in which control and direction are located at the top of the organization. Communication flows from the top downward with little or no lateral or vertical information exchange.

---

[20] For a detailed discussion of the Systems 1 to 4 concept, see Bowers, 1976 and Likert and Likert, 1976.

> Decisions are made at the top and are often based on inaccurate or incomplete information. Fear, money, and a desire for power are the primary sources of motivation. There is very little trust, little shared responsibility, and little team cooperation.
>
> System 2: Benevolent Authoritative
>
> System 2 represents a slight improvement over System 1. Not all decisions are made at the top. Policy decisions are still made there, but some of the implementation decisions are decentralized. Communication is still inaccurate and not well trusted. Fear is less a motivational source but is still occasionally used.
>
> System 3: Consultative
>
> System 3 is an improvement upon System 2. Only the broadest policy decisions are made at the top. Some use of group methods for problem solving may be found, although most decisions are made by the leader after consultation with subordinates. Communication is fairly accurate and complete. Motivation sources are generally those located internal to the individual, such as the need for achievement, need for extensive rewards, or the need for new experience. There is little hostility, and most people in the organization feel some responsibility for its welfare.
>
> System 4: Participative Group
>
> System 4 is the most democratic system. All decisions are made by overlapping groups coordinated by the link pins. Decisions are reached through consensus. Information flows freely. Motivational sources employed are those found both within the individual and those stemming from group processes. Trust is prevalent throughout the organization.

The effective organization is the System 4 organization. The System 4 school organization will maximize both educational output and the satisfaction of the teaching staff. An organization that moves from the vicinity of System 1 toward System 4 is becoming more effective. Likert believes that most school managerial systems are about System 2½, while those managers at the very top (superintendent, school boards, etc.) of the organization employ about a System 3.

Empirical Research

The empirical base of the Likert conceptualization of effectiveness is quite broad, although much of the literature is focused on organizations in the private sector. While a thorough review of this literature would certainly be applicable in the present context, it was judged unnecessary, because there are a reasonable number of studies specifically in the educational domain. Within the educational domain, only those studies will be reviewed that deal with aspects of the Likert theory most applicable to the present research. The following literature summary is organized around several constructs important in Likert's work. These are organization climate, supervisory-leader behavior, staff satisfaction, and school performance. Studies mentioning a more global effectiveness indicator, innovation, are also included.

Organizational Climate

Mangee (1976) examined selected aspects of climate, leadership, and helping behavior of elementary principals. His data set included 20 principals and 343 teachers. His measures of climate and leadership were derived from the SOO. Subindices of the climate construct included decision making practices, communication flow, human resources primacy and technological readiness. His leadership index included the subindices: support, goal emphasis, work facilitation, and team building. A correlational analysis of teacher responses yielded Spearman rank order correlations as follows:

Organizational Climate: Leadership (r = .83)
Organizational Climate: Helping Behavior (r = .94)
Leadership: Helping Behavior (r = .87)

The thrust of this study was to examine principals' perceptions of their own behavior vs. teacher perception of the principal. Mangee's findings indicated that principals scoring lowest on climate, leadership and helping behavior (as measured by teacher responses) had the largest difference between their own perceived scores and those reported by their teaching staff.

Shaw (1976) studied the relationships among organization climate, principal leadership, and teacher job satisfaction. He collected data from 40 secondary schools using the POS to measure climate and leadership, and used the Minnesota Satisfaction Questionnaire to measure satisfaction. Subindices of the climate index included decision process, goal commitment, and team cooperation. The leadership construct included support by the leader, decision making, leader's receptivity to ideas, team building, work facilitation, and goal emphasis. The job satisfaction scale was a general index of overall satisfaction. Intercorrelations were as follows:

Climate: Leadership (r = .84)
Climate: Satisfaction (r = .86)
Leadership: Satisfaction (r = .72)

The focus of the study was on the degree to which Catholic and public secondary schools differ. Shaw's findings indicated that the Catholic schools scored higher on the climate, leadership, and satisfaction scales (were closer to System 4), than did the public schools.

Supervisory Leadership

Bernhardt (1972) examined the relationships between perceived school characteristics and teacher militancy. He used the POS and studied 67 schools in 12 school districts. The school characteristics were derived from the POS and included leadership processes, team cooperation, communication, decision making, goal setting, interaction, and motivation. Teacher militancy was defined as the propensity toward "...collective action by teachers using forceful aggressive tactics to achieve objectives" (Bernhardt, 1972, p. 18). His findings indicated that low involvement in decision making, and/or low involvement in goal setting, and/or low levels of communication were significantly correlated with high positive teacher attitudes toward militancy. The closer to System 4 the school administration was perceived to be, the less favorable the attitude toward militancy.

Byrnes (1973) examined relationships among perceived supervisory style, school participativeness, departmental participativeness, and teacher job satisfaction in high schools. Building upon the work of Amidon and Flanders (1961), Byrnes defined supervisory styles as either Direct (giving a great deal of direction and criticism) or Indirect (asking many questions, doing a great deal of reflecting). Other organizational characteristics studied were leadership processes, communication processes, interaction-influence processes, decision making processes, goal setting processes, and motivation. His results indicated that high job satisfaction was related to high principal-teacher interaction, high principal support, and high amounts of perceived participation in decision making. In other words, schools scoring more toward System 4 rated satisfaction higher than those scoring at the lower end of the continuum.

Carr (1971) studied high school principals and examined their perceptions of the system's supervisory style. Results indicated that those principals who perceived the supervision of the system to be more toward System 4 (especially in its decision making practices) were more highly satisfied with pay, promotion opportunities, peers, and with the system's leadership.

Cullers, Hughes and McGreal (1973) examined six high schools using the POS. They also reported the results of a study comparing student satisfaction and school size. Their data indicate that (1) students are least satisfied in small schools, and (2) small schools are most likely to have supervisory leader styles closer to System 1 in orientation than to System 4.

Feitler (1971) studied 23 elementary schools using both the POS and Stogdill's LBDQ. After factor analyzing the POS scales, Feitler found one underlying construct, organization environment. He also compared 5 factors of the POS with 12 subscales of the LBDQ and concluded that:

> "without exception, a large portion of each of the variances in the system oriented processes is explained by one or a combination of the task oriented processes of the Profile of a School" (Feitler, 1971, p. 130).

Generally, this study presented evidence linking leadership with various organizational characteristics and indicated some support for the causal nature of the leadership variables.

Ladouceur (1973) studied 8 secondary schools and 42 elementary schools, using the POS to measure the management profile of the schools and his own instruments to measure school change capacity, change perspective, climate for change, and teacher orientation toward involvement in change. Ladouceur found a significant positive relationship between the management profile (System 1-4) of the school and school change climate, teacher innovative activity, teacher innovative orientation, and capacity for change. These results supported the premise that an orientation toward participative management by school administration (System 4 behavior) can cause teachers to develop a larger capacity for change than does a System 1 orientation.

Lepkowski (1970) studied high school teachers. Using the POS, she examined the relationships between leader supportiveness, cooperative decision making, communication, and trust. Her results indicated that highly supportive principals would encourage more cooperative decision making. Leaders who were effective communicators also encouraged cooperative decision making. Degree of trust was positively correlated with leader communciation.

Martin (1972) used the POS and examined the impact of a school decentralization project on level of perceived participation in decision making. While no clear results emerged from the study, Martin did find that various constituencies within the school (teachers, parents, students, etc.) viewed amount of participation differently. Teachers believed participation had increased, while parents, principals and other administrators saw no change.

Staff Satisfaction

Carpenter (1970) found that teachers had greater need satisfaction in flatter organizational structures than in those with taller, hierarchical configurations. This suggested that those schools with participative work group structures were more able to satisfy teacher needs than were those with more authoritarian systems.

Chung (1970) studied 21 schools and found high teacher satisfaction moderately correlated ($r = .50$) with a teacher-centered management style. Such a style was characterized by participatory decision making practices, good support for professional growth, and good quality of personal relationships.

Morall (1974) studied five high schools using the POS and examined the relationship between the administrative system of the school and staff morale. Morall's data indicated that the closer a school's administration was to System 4 the higher the participation in decision making, and the higher the reported morale of both teachers and students.

Smith (1975) examined 37 elementary schools using the POS and the Purdue Teacher Opinionnaire (PTO). The PTO provided the single morale measure. The Profile of Schools was used to develop several scales: general participative management, climate, leadership, trust, and other intervening variables (peer team building and communication). These scales were then correlated with the morale measure, producing the following results:

Morale: All POS scales (r = .65)
Morale: Climate (r = .74)
Morale: Leadership (r = .68)
Morale: Trust (r = .67)
Morale: Other Intervening (r = .53)

These results were seen as supportive of the hypothesis that high levels of teacher morale would be associated with a participatory management style.

School Performance

Belasco (1973) studied four schools, two elementary and two junior high. He did not use the POS, but derived his own instruments from the Likert theory. Major variables examined included educational achievement, participative decision making, and trust. This research produced three major findings. First, student achievement was greatest in the two schools classed as "high involvement" schools. In these schools regular monthly meetings were held between parents and school staff. In the "low involvement" schools the only communication medium utilized was routine written announcements. Secondly, student achievement was greatest in classes led by teachers who reported higher levels of satisfaction with participation in decision making. Lastly, this teacher satisfaction was the single most important predictor variable of student achievement.

Ferris (1965) examined two high schools identified as being of "good quality." He did not use the POS (it was not as yet developed), but devised his own instruments directly from the Likert theory base. His results indicated that the high quality schools (as identified by two independent panels of experts) were characterized by System 4 concepts. These concepts included communication, leader supportiveness, influence, group loyalty, participative decision making, trust, and principal work facilitation.

Innovation

Innovation, while not a Likert concept, appears as a dependent variable in several of the studies using the Likert theory. Innovation is generally defined as change, or the capacity for change in the direction of systemic goal attainment.

Broman (1974) used the POS in studying 64 secondary schools. He examined the relationships among innovativeness, principal leadership, interaction-influence processes, communication processes, and decision making processes. His data showed no significant correlations between any of the independent variables and innovativeness, although all were in the expected (positive) direction.

Gehrman (1970) studied 10 high schools, 5 of which were classified (by experts) as innovative, and 5 which were not. Student response data showed that the leadership styles of the innovative schools were more toward System 4 than were those for the non-innovative ones. Teacher data, however, were less clear.

Naumann-Etienne (1975) examined eight elementary schools: four classified by experts as embracing the tenets of "open education," four identified as traditional. She examined several constructs (climate, leadership, trust, other variables, and end-results) and concluded that principals in the innovative schools scored significantly higher (more toward System 4) on them than did those in traditional schools.

Wiener (1972) studied 12 elementary schools, 6 innovative and 6 non-innovative. He measured leadership and organizational climate in all schools. Although not statistically significant, his results showed differences in both leader style and climate between the two types of schools. He concluded that the innovative schools did have a more System 4 administrative structure than did the non-innovative schools.

This concludes the review of literature related to organizational effectiveness and to the Likert approach to the study of the construct. Literature relevant to (1) specific dependent variables (i.e., satisfaction, performance, absenteeism), (2) independent variables (i.e., leadership, climate), and (3) the methodology, will be examined as appropriate in later chapters.

SUMMARY

This chapter presented a review of the literature germane to the study of organizational effectiveness. After briefly discussing the nature of schools as organizations, an historical account of the development of the effectiveness construct was presented. This was followed by an analysis of the two basic approaches to the study of effectiveness--the Goal-Centered and the Systems models. The goal approach is based on the assumption that organizations are continually striving to attain some set of goals or objectives. The systems approach is based on the assumption that organizations are dynamic systems striving to maintain internal stability while dealing adequately with their external environment. Criticisms of each of the approaches were discussed. It was concluded that the systems approach offers the clearest normative pronouncements on the nature of effectiveness.

Several specific models were then examined, both in the interest of completeness and to highlight emerging trends in the literature--especially the tendency toward combination of the goal and system approaches. Following this, two attempts at construct reframing were presented. These two approaches, by Cunningham (1977) and Kilmann and Herden (1976), attempt to move away from the goal vs. systems concept toward a more global definition of the construct.

The nature of the effectiveness measurement criteria (the dependent variables of effectiveness research) was then discussed. It was noted that almost every dependent variable ever studied in the field of organization behavior has been operationalized as an effectiveness criterion. Various characteristics of the criteria were discussed, including the hard vs. soft continuum, non-independence, and univariate vs. multivariate measures. Other problems with effectiveness criteria were also listed: criterion deficiency, stability, generalizability, construct definition and validity, client group definition, and time perspective.

The second half of the chapter examined the model of effectiveness developed by Likert and his associates at the University of Michigan. The model is one of several systems approaches to the study of effectiveness. Developed initially for private sector organizations, a more recent version has been proposed specifically for schools. This version was examined in some detail. Certain concepts are applicable to both types of organization, however. These include: (1) the role of the work group; (2) the importance of participative decision making; (3) the link-pin structure of organizations; and (4) the nature of the causal, intervening, and end-result variables of the model.

The Profile of Schools (POS) version of the Likert model was then presented. Major causal variables discussed included Organizational Climate and Supervisory Leader Behavior. Intervening variables included Team Interaction, Mutual Trust, and Peer Behavior. End-result variables included Educational Performance and Staff Satisfaction. These variables were then arrayed in an iconic model depicting the causal nature of their relationships with one another.

Following this the managerial Systems 1-4 continuum was examined and the System 4 organization was further defined and used as a model of the effective organization. Such an organization can be characterized as one which: (1) is most democratic; (2) employs consensus decision making practices; (3) has free information flow--upward, downward, laterally; (4) relies on internal individual motivation as well as motivation generated by work group processes; and (5) evidences a great deal of trust.

The last section of the chapter presented an overview of relevant empirical research using the Likert approach in school settings. This summary was organized around the basic causal, intervening, and end-result variables mentioned previously. All of the studies reviewed in this section dealt in some way with variables or concepts related to concepts operationalized in the present study.

CHAPTER III

THE GENERAL PROCEDURES

This chapter presents background material relevant to the current study. It includes information on the Study of Schooling and its sampling plan, instrumentation, and data collection procedures. This is followed by a discussion of the data sources utilized. The chapter concludes with an overview of the data treatment procedures to be followed in succeeding chapters.

THE STUDY OF SCHOOLING

The Study of Schooling (SOS) was conceived as a descriptive, hypothesis-generating study of a number of facets of behavior in American schools. It had its foundations in an earlier study (Bentzen, 1974; Goodlad, 1975) that investigated the process of change. This study concluded that, to be effective, a change strategy must be holistic, that is, it must take all features of the educational experience into account. Piecemeal change efforts such as those focusing only on curricular reform, leader behavior, or facilities modernization have reduced chances of success. Effective, long-lasting change strategies are systemic, affecting all areas of the school organization. However, since knowledge of the change process is as yet incomplete, some of these effects may be unintended and unplanned for. Accurate measurement of system-wide change is required, in order to pinpoint possible cause and effect relationships between interventions and outcomes. An important recommendation from this study was that further research be undertaken to investigate the systemic change process.

A major first step in such an investigation had to be the analysis of comparative research data, in a search for common variables imbedded in comparable settings. It was felt that these data did not as yet exist, nor was there an adequate methodology developed with which to collect them. Consequently, the Study of Schooling began with four objectives:

(1) To develop a holistic method for describing schools. Such a method will enable us to examine simultaneously the curriculum, adult work life, student life in classrooms and schools, and the relationship between schools and communities.

(2) To describe a sample of schools. The sample of schools will include grades one through twelve, as well as a range of economic statuses, school sizes, racial/ethnic mixes and rural/ metropolitan mixes.

(3) To illuminate and clarify critical problems and issues in schooling. Some issues have been posed by us, some will arise out of the data, and still others are being provided for us by specialists in the field and from surveys of the literature.

(4) Make recommendations for school improvement. These recommendations will be the result of comparing the information gathered to meet objective (2) and those "What should be" proposals emerging from our reviews of the literature and from the counsel of several panels of advisors.[21]

These objectives resulted in the development of a set of instruments and methodologial procedures which were used to gather descriptive data on a nation-wide sample of schools.

Beginning in the Spring of 1974, the SOS was divided into a series of phases. The period of Spring, 1974-Summer 1975 saw the project conceptualization, development of the overall research design and sampling plan, and the construction of the instrumention and data collection methods. These initial instruments and procedures were pilot tested in three schools in the Fall of 1975. Information gleaned during the pilot test was analyzed and the methodology was revised during the remainder of 1976. National data collection began in roughly two-fifths of the sample in the Spring of 1977, and was completed in the remaining schools during the Fall of that year. Feedback to participating schools occured in the Spring of 1978. Data analysis and production of research reports began in 1978 and will conclude in 1980. It is intended that the data base resulting from the study, as well as the instruments used to generate it, will be made available to other researchers and school districts upon the termination of the project.

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[21] IDEA Research, Design and Conceptualization (Elaboration). Training document, Los Angeles, Ca., 1977. (Photocopied.)

SAMPLING PLAN

In order to study the entire span of schooling from first through twelfth grade, the SOS examined school triples. A triple consisted of a high school, a feeder junior high or middle school and a feeder elementary school. Table 3.1 presents the school sampling matrix used by the SOS. Selection of the triples to be included in the study was based upon five stratifying variables: geographic location (reflecting regional differences); size (based on high school teacher and student population); socio-geographic description (urban--rural); economic status (high--low); and ethnic mix (mostly white, mixed, mostly non-white). No attempt was made to ensure a stratified random sample. Instead, it was decided to include triples deemed representative of various, commonly occurring types of schools found throughout the U.S. Accordingly, data were collected in 13 triples, representing seven states (Mideast, Southwest, Far West, Northwest, South, Upper Midwest, Midwest).

TABLE 3.1

SCHOOL SAMPLING DESIGN

Geographic Location	Size			Socio-Geographic Description				Economic Status				Ethnic Mix		
	Large	Medium	Small	Urban	Suburban	Rural/ Suburban	Rural	High/ Middle	Middle	Middle/ Low	Low	Mostly White	Mixed	Mostly Non-White
Mideast														
Triple #1	X					X			X			X		
Triple #2		X				X				X		X		
Southwest														
Triple #1		X				X				X			X	
Triple #2	X			X							X			X
Far West														
(1 Triple)	X			X					X				X	
Northwest														
Triple #1		X				X			X			X		
Triple #2			X	X					X			X		
South														
Triple #1		X			X			X					X	
Triple #2			X				X				X		X	
Up. Midwest														
Triple #1	X			X					X					X
Triple #2		X			X					X		X		
Midwest														
Triple #1			X				X		X			X		
Triple #2			X				X		X			X		

For purposes of this study, only data from the high schools and junior high/middle schools have been analyzed. It has been noted (Likert, 1976) that the organizational structure of elementary schools differs substantially from that of secondary schools. Secondary schools tend to be taller[22], that is, they are composed of several hierarchical levels. These schools normally consist of several departments, each with a department head reporting to one or more vice- or assistant principals. Elementary schools are more often flat, frequently containing only a principal and the teaching and administrative staffs who report directly to him/her.

Another consideration in the elimination of elementary school data from the present study resulted from an examination of preliminary factor analytic data (Sirotnik, 1970a). It appeared that the primary clustering pattern on most scales was similar for junior and senior high schools, but differed radically at the elementary level. These results are interpretable, but such an analysis lay outside of the scope of the present investigation. Elementary schools have, therefore, been omitted in the interests of (1) controlling for structural differences; and (2) limiting the scope of the study.

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[22] Numerous studies have been reported dealing with the effects of structure in comparative studies of organizations. One subset of these studies has emerged from the Aston group (Aldritch, 1972). These studies have yielded a number of highly intercorrelated structural variables, one of which is shape (tall vs. flat). However, there are no consistent patterns of correlation reported.

INSTRUMENTATION

Survey questionnaires and interview schedules were developed for teachers, students, parents, school and district administrators, other adult school staff, and members of the community at large. These instruments represent a synthesis of and expansion upon many such instruments commonly used in educational research.[23] In addition, an observation instrument was constructed for use in recording teacher classroom behavior.

After pilot testing, the instrument package was extensively revised to eliminate redundant items and scales. Item reversal was used on some questionnaire items, while other items were eliminated entirely. Data collection procedures were modified and student interview data was eliminated. Data collection time per triple was fixed at 20 days, and the primary instruments were converted to optical scan form. More detailed information on the sample and methodology of A Study of Schooling can be found in Overman (1979).

DATA COLLECTION PROCEDURES

Data collection in the secondary schools proceeded as follows:[24]

1. At each secondary school, a representative sampling of course offerings was taken.
2. All sampled classes were observed for entire periods and on three separate occasions.

---

[23] Some individual items used by the SOS and by the present study were suggested by concepts found in Likert's Profile of Schools (Likert, 1972); Halpin and Croft's Organizational Climate Description Questionnaire (Halpin and Croft, 1962); and the Ohio State Researchers' Leader Behavior Description Questionnaire (Halpin, 1957).

[24] IDEA Research, Procedures. Working document, Los Angeles, Ca., 1978. (Photocopied.)

3. All students present in the sampled classes were administered questionnaires.

4. Questionnaires were given to all teachers at the school. Additionally, teachers of the sampled classes were extensively interviewed.

5. Questionnaires were administered to all other non-teaching professional staff (principals, counselors, librarians, curriculum specialists, etc.). Interviews were also conducted with the administrators.

6. Additional data were obtained concerning financing, resource allocations, personnel policies, demographic information, absenteeism, truancy, expenditures per student, teacher turnover, etc., at the district level.

7. Questionnaires were sent to all parents in each of the schools to secure data regarding their perceptions of and expectations for those schools.

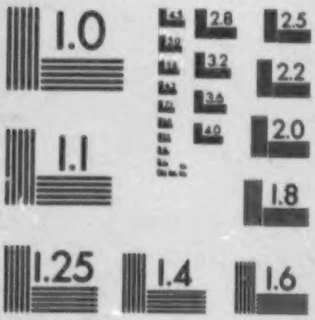
8. Questionnaires were sent to an equal number of community residents to secure their perceptions of the schools.

9. School board members were interviewed and sent a questionnaire to secure their perceptions of the schools.

Data were collected from students, teachers, principals, parents, community residents, school board members, and district administrative staff in 25 secondary schools: 12 junior high/middle schools, 12 senior high schools and 1 combined junior/senior high school.

DATA SOURCES UTILIZED

The present study viewed the schools from a systems perspective. Each school, therefore, became a unit having the properties common to all systems. One of these properties, the boundary, was of concern during the selection of data sources to be utilized. Since the study was to focus on the adult working life within the school, it was decided to encompass all adults working within the organization. These subjects became the internal data sources. All other adults (i.e. parents, school


1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1010a
(ANSI and ISO TEST CHART No. 2)

board members, community others) were defined as being external to the unit of the individual school. Students were seen as boundary spanners, having properties of both internal and external data sources. The trained observers who were sent into the school functioned as external data sources temporarily inserted into the system. Available data sources may thus be grouped into (1) those internal to the school (building administrators, teachers); (2) those external to the school (parents, school board members, community residents, and various district staff offices); (3) boundary spanners (students); and (4) trained observers. A summary of available data sources, as well as those actually used in the present study, is given in Table 3.2.

Both the Causal (Climate, Leadership), and Intervening (Trust, Peer Work Environment) variables included in the study are concerned with processes occurring internal to the organization. This suggested including all of the internal data sources as measures of these variables. However, since the study was interested primarily in teacher perceptions of their work place, only teacher data were included. The End Result (Job Satisfaction, Job Performance) and Other Causal variables were somewhat different in scope. Job Satisfaction was defined as an aggregated measure of the satisfaction experienced by teachers due to various facets of their jobs. Hence, teacher self-report data are utilized in the measurement of this variable. Job Performance was conceptualized as an output measure resulting from the processes internal to the system. As an output measure, it should best be evaluated by sources external to the system. Therefore, student self-report, parent self-report, and archival data were utilized. School board and community

TABLE 3.2

DATA SOURCES UTILIZED

Available Data Sources

Variable		Internal						External				
		OBS	AI	TI	TSR	ASR	SSR	SBI	PSR	SBSR	CSR	A
Causal	C	O	O	X	X	O	O		O		O	
	L	O			X	O	O					
Inter-vening	T				X	O	O					
	P				X		O					
End-Result	JS				X	O	O	O	O	O	O	
	JP	O			O	O	X	O	X	O	O	X
Other Causal					X							X

X = Data Sources Actually Used to Operationalize Variables.
O = Available Data Sources, Not Used

OBS = Observation
AI = Administrator Interview (principal, vice principal)
TI = Teacher Interview
TSR = Teacher Self-Report
ASR = Administrator Self-Report (principal, vice principal, head counselor, head librarian)
SSR = Student Self-Report
SBI = School Board Interview
PSR = Parent Self-Report
SBSR = School Board Self-Report
CSR = Community Self-Report
A = Archival (district and school staff offices: adult personnel, pupil personnel, business, building and site, curriculum)
C = Climate
L = Leadership
T = Trust
P = Peer Work Environment
JS = Job Satisfaction
JP = Job Performance

resident data were not used due to their apparent unreliability.[25] Observation data were not used due to their unavailability at the time of the present study. The Other Causal variables were a mixture of variables with origins both internal (faculty ethnicity, education level, years total teaching) and external (SES, unionism, environmental turbulence) to the system. Consequently, these variables are operationalized with data from both teacher self-report and archival sources.

As can be seen from Table 3.2, utilized data comes primarily from survey collection methods, with lesser reliance on interview and archival sources. Survey data are available from 1,064 teachers, 6,900 parents, and 13,719 students; interview data are available from 816 teachers; archival data are available from all 25 schools; and miscellaneous data (data collector daily logs, anecdotal data from students/ teachers, publicity, (i.e. local and school newspapers) are also available from all schools. Response rates for the primary data collection tool, the teacher survey, varied from a low of 52% at one school to 100% at four schools, with the majority of schools (15) falling in the 90%-100% range.

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[25] Overman, B. Personal Communication, 1978.

DATA TREATMENT PROCEDURES:

OVERVIEW AND PRELIMINARY ACTIVITIES

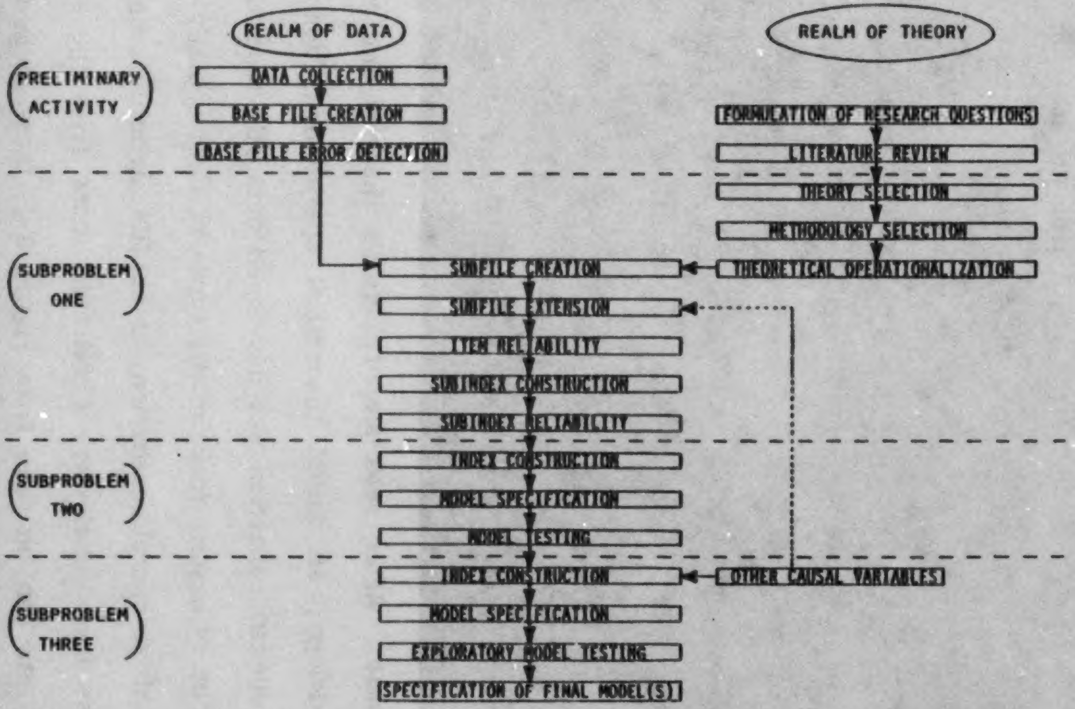
In order to more easily understand the fit between the various data treatments of the study and the research problem under investigation, a summary of the entire study is presented here. Figure 3.1 builds upon the stages involved in the preparation and processing of survey data suggested by Payne (Payne, 1976). The present study, like all research efforts, continuously moved between the realm of the data and of theory relevant to, or testable by, these data. The first three steps in the data realm, data collection, base file creation of machine readable survey data, and base file error detection/correction, were carried out by IDEA prior to the conception of the current research problem.

The current study began with selection of an area of research interest -- organizational effectiveness -- followed by a review of the literature in a search for theories amenable to investigation, given the available data base. After selection of Likert's theories and of an appropriate methodology, an initial theoretical operationalization was attempted. This operationalization was developed primarily from the tenets of the theory, but with some feel for the types of data actually at hand. Based on this initial operationalization, a subfile structure was created from IDEA's base file, consisting of selected items from the secondary teacher survey. As can be seen from Figure 3.1, these steps mark the beginning of the treatment of Subproblem One.

The subfile was extended by: (1) the addition of teacher interview data and parent and student survey data; (2) the transformation of certain items from continuous to categorical items and the recoding of certain others; (3) the addition of group level variables; (4) the addition of

FIGURE 3.1

DATA TREATMENT PROCEDURES


REALM OF DATA
REALM OF THEORY
PRELIMINARY ACTIVITY
DATA COLLECTION
BASE FILE CREATION
BASE FILE ERROR DETECTION
FORMULATION OF RESEARCH QUESTIONS
LITERATURE REVIEW
THEORY SELECTION
METHODOLOGY SELECTION
THEORETICAL OPERATIONALIZATION
SUBPROBLEM ONE
SUBFILE CREATION
SUBFILE EXTENSION
ITEM RELIABILITY
SUBINDEX CONSTRUCTION
SUBINDEX RELIABILITY
SUBPROBLEM TWO
INDEX CONSTRUCTION
MODEL SPECIFICATION
MODEL TESTING
SUBPROBLEM THREE
INDEX CONSTRUCTION
OTHER CAUSAL VARIABLES
MODEL SPECIFICATION
EXPLORATORY MODEL TESTING
SPECIFICATION OF FINAL MODEL(S)

potential causal variables, other than those suggested by Likert's theories; and (5) the computation of group means from individual level items. After these modifications were made, errors were detected and corrected in the subfile. The reliability and construct validity of the selected items was then checked by an examination of the between-groups correlations. Items not demonstrating high correlation with others selected as measures of a given subindex were deleted. Items showing uniformly high correlations across all subindices were likewise deleted. In addition, several subindices were redefined, using other items from the data pool. This process resulted in the initial subindex structure. Finally, the reliability of the subindex structure was examined by comparing the between-groups correlations for all subindices, and the subsequent deletion of several as potential index measures.

The treatment of Subproblem Two began with the initial construction of the indices, using the remaining subindices. This resulted in the creation of 6 indices, consisting of 28 subindices, which in turn, contained 56 items. After reviewing these indices and comparing them with the tenets of Likert's theory, 15 subindices were selected for inclusion in the specification of the model. The structural equation model was then examined using the LISREL IV program. Following the initial model testing it was determined that the six-index model could not be fit, given these data.

The treatment of Subproblem Three began with the redefinition of four alternate indices, Leadership, Internal Work Environment, Satisfaction, and Performance, based on a review of the results from the preceding subproblem. A factor analysis was then performed in order to select optimum indicator subindices. After a review of the literature on schools as organizations, two other variables were selected (i.e. School Socioeconomic Level, Environmental Turbulence) as possible exogenous variables for the alternate models of effectiveness. A series of models was then tested consisting of the four indices (composed of 14 subindices), and of two other causal variables, SES and Environment. Finally, a number of alternate models of organizational effectiveness were proposed and compared, with one model being ultimately selected as providing the best fit to the available data.

We now turn to a discussion of the processes conducted prior to the actual data treatments of the various subproblems.

Data Collection

A summary of IDEA's data collection procedure has been given earlier. It was assumed, for purposes of the present research that these procedures, as designed and implemented, were adequate and produced a body of valid data.[26]

Base File Creation

The majority of the instruments used in IDEA's data collection were in machine-readable form. They were optically scanned by Intran, Inc., a Minneapolis-based firm specializing in the processing of large-scale surveys. After scanning and preliminary error detection/correction, the data were recorded on magnetic tape and sent to IDEA for further cleanup.

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[26] For a more comprehensive review of the Study of Schooling, see Goodlad, 1979; and Goodlad, Sirotnik, & Overman, 1979.

Base File Error Detection/Correction

Most of the error detection and correction was accomplished by Intran at the time of the optical scanning. Additional errors were occasionally discovered as IDEA worked with the data and were rectified as appropriate. By the time the data were made available for the present study, they had been thoroughly reexamined and were assumed to be error free.

Formulation of Research Questions

The formulation of researchable questions was a lengthy process. The initial impetus for consideration of this particular realm of theory came from an earlier interest in the evaluation of Organization Development (OD) activities. It was felt that, in order to be able to evaluate the effects of interventions into organizational settings, it would first be necessary to determine standards against which to measure change. A search for these standards led naturally to the concept of organizational effectiveness.

Organization Development, as a body of knowledge, is aimed at improving organizations by: (1) Helping organizations to enhance performance and to increase the efficient use of available resources. And by (2) helping to improve the quality of life of the people who live and work within the organization. It was obvious that, to be useful in answering the ultimate question of utility, theories of effectiveness needed to be considered that contained the twin foci of performance and satisfaction as criteria of effectiveness. Accordingly, a review of the literature on organizational effectiveness was begun, with an emphasis on those theories containing both of these elements.

Literature Review

The thrust of the present research began to be clarified as the survey of the literature yielded information regarding the two generic approaches to the study of effectiveness: the Goal-Centered and the Systems. It became clear that the dominant paradigm in the field is the systems approach. It was also apparent that there was little in the organizational effectiveness literature relating directly to schools. One model, that of Likert and his associates at the University of Michigan did, however, have application to the school setting. The theoretical and empirical literature relative to this model was then examined in order to determine if the Likert approach could be operationalized, given the data available. At that time it became apparent that the Likert model was appropriate for the present purposes.

This concludes the presentation of background material on the study. The next three chapters will take up the treatment of the data as organized by subproblem.

SUMMARY

This chapter presented (1) relevant background information on the Study of Schooling, and (2) a discussion of the preliminary steps employed in data cleanup and theory selection. The Study of Schooling (SOS) was conceived as a descriptive, hypothesis generating study of many facets of schooling in America. The original goals of the study were fourfold: (1) to develop a holistic method for describing schools; (2) to describe a sample of schools; (3) to illuminate and clarify critical problems and issues in schooling; and (4) to make recommendations for school improvement. Conceived in 1974, data were collected during 1977, and analysis is expected to be concluded in 1980.

The SOS examined "triples" of schools: a senior high school and a feeder junior high or middle school as well as a feeder elementary school. Data were collected in 13 triples representing 7 states. Data are available from 1,064 teachers, 6,900 parents, and 13,719 students.

For purposes of the present study, only data from the 25 junior-middle and senior-high schools are used. Elementary schools are not included primarily because it was felt that the structures and problems encountered in elementary school organizations are largely unlike those encountered at the upper grade levels.

Survey instruments and interview schedules were developed for, and administered to, teachers, students, parents, administrators and others in the school community. For purposes of the present study, only a limited amount of available data are utilized. These include data from teachers, students, parents, and archival records.

Following the discussion of background material on the Study of Schooling, a flow diagram was presented, detailing the various steps involved in the treatment of the data for the present study (Figure 3.1). Lastly, the "preliminary activity" steps were discussed.

CHAPTER IV

THE RESULTS: SUBPROBLEM ONE

This chapter is concerned with the treatment of the data and the resultant findings germane to the area of inquiry of Subproblem One. It also includes interpretation of the findings and a discussion of limitations on the findings and/or upon the processes used to treat the data. A similar format will be followed for Subproblem Two (Chapter V) and Subproblem Three (Chapter VI).

SUBPROBLEM STATEMENT

The first subproblem was to operationalize Likert's model and to examine the internal consistency of the operationalization that was produced.

RESEARCH HYPOTHESIS

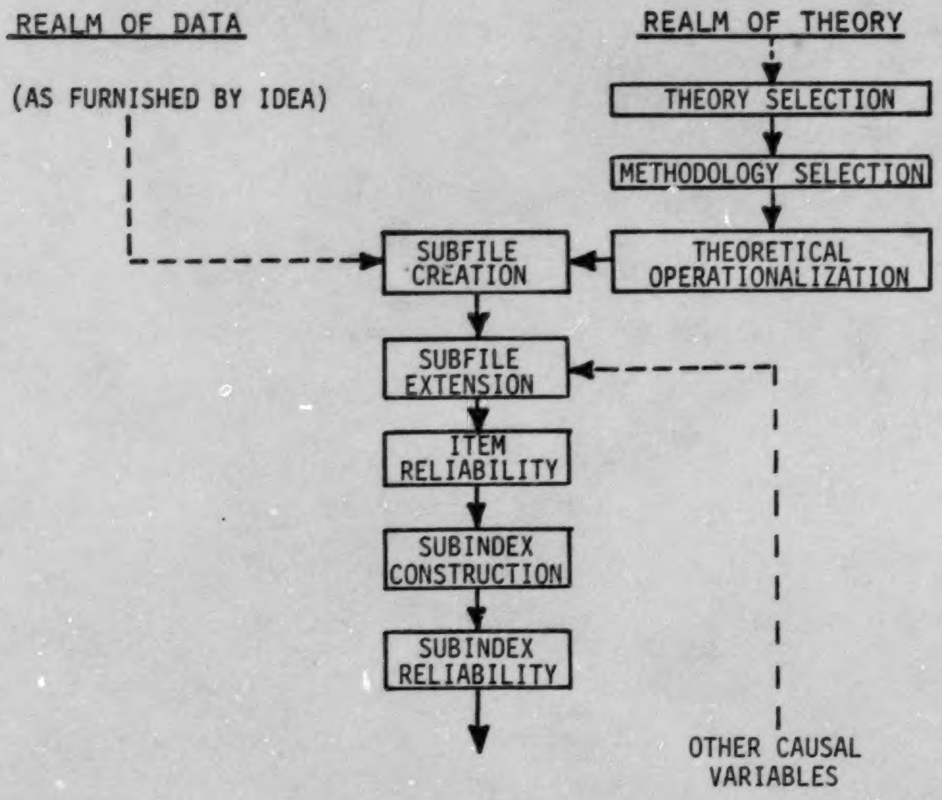
The research hypothesis for Subproblem One was that Likert's model of effective organizations could be operationalized for testing using data derived from instruments other than Likert's own Profile of Schools or ISR's Survey of Organizations. If this hypothesis is accepted, then further subproblems and research hypothesis would be built upon the data set generated by the data treatment procedures of this subproblem.

DATA TREATMENT PROCEDURES

The format for presentation of the treatment of the data for this subproblem will parallel the structure outlined earlier in Figure 3.1. The portions of Figure 3.1 pertinent to the discussion of Subproblem One are reproduced here as Figure 4.1.

FIGURE 4.1

DATA TREATMENT PROCEDURES - SUBPROBLEM ONE


REALM OF DATA
(AS FURNISHED BY IDEA)
REALM OF THEORY
THEORY SELECTION
METHODOLOGY SELECTION
THEORETICAL OPERATIONALIZATION
SUBFILE CREATION
SUBFILE EXTENSION
ITEM RELIABILITY
SUBINDEX CONSTRUCTION
SUBINDEX RELIABILITY
OTHER CAUSAL VARIABLES

Theory Selection

The actual treatment of the data for Subproblem One began with the selection of the Likert theory for operationalization and testing. As has already been noted, selection of this theory was based on several considerations: (1) Likert's theory has been formulated in conjunction with a large, growing data base, and is, therefore, more empirically grounded than many other systems models. (2) IDEA's survey items were built with some of Likert's concepts in mind. Consequently, some degree of fit between available data and substantive requirements already exist. (3) One of the few examples of the application of path-analytic techniques to organizational theory was based on several of Likert's theoretical concepts (Franklin, 1973, 1975a, 1975b). It was hoped that this earlier attempt at causal modeling could both provide valuable insight into practical research problems and, more importantly, serve as a touchstone for comparison of the results of the present study. (4) Likert's model was composed of discrete variables which appeared to lend themselves well to the statistical methodology (structural equation modeling) under consideration for the actual analysis of the model.

Methodology Selection

After the basic set of concepts had been selected, it was then necessary to choose the statistical methodology most appropriate to both the theory and the data. For reasons to be discussed shortly, causal modeling was selected as the technique of choice.

Bentler (1978, p. 274) defines causal modeling as an attempt "to translate theoretical statements regarding the influences of certain sets of variables on others into a complete system framework that yields testable statistical consequences." The various approaches to causal modeling (the terms causal modeling, path analysis, and structural equation modeling will be used interchangeably here) are designed to allow the researcher, model builder, or practitioner to draw inferences concerning potential cause-and-effect relationships among hypothesized constructs. While causality may never be conclusively proven, it is hoped that these approaches to data analysis can help one to make more informed statements concerning the nature of reality.

Given the increasing reliance (for good or for ill) of modern technological societies upon the predictions and pronouncements of social science, it has become imperative to ensure that such predictions are as reliable and as valid as possible. The search for solutions to social problems can be facilitated by the development of the ability to accurately predict certain effects, given specific causes. This concern with causality is a familiar one in the social sciences. Experimental and quasi-experimental research designs were developed in large part to deal with this issue. Unfortunately, these powerful designs are often impractical or impossible to apply to ongoing, real-world situations[27]. For this reason, various statistical techniques using correlational data were developed, chiefly by econometricians and biometricians, for use in their work with relatively inflexible systems. Again, the desired outcome of these methods is the development of the ability to infer causality.

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[27] However, see Cook and Campbell (1976) for an excellent discussion of methods of conducting experiments and quasi-experiments in organizational settings. See also Kenny (1975) and Linn & Werts (1977), for further information on nonexperimental procedures.

Moving to another level, that of the philosophy of science, we see that causal modeling can also aid the development and refinement of social science theory. Heise (1972) has observed that, if nothing else, causal modeling techniques force the scientist to confront his/her assumptions and make them visible. Once assumptions are so identified, they become less problematic: the propositions and corrolaries following from them become clearer; other, hitherto unseen, research directions may suggest themselves. More specifically, causal modeling may have applications at several points in the social scientific process, especially for data exploration, model building, and theory testing (Bentler, 1978). It must be realized, however, that these techniques are only appropriate when the substantive theory base of a particular field is rich enough to provide a set of interrelated constructs for modeling. Without some identifiable variables and without some preliminary idea as to how they are ordered it becomes impossible to set up the initial causal model. Hopefully, the fields of education and organizational behavior have reached a point where they can support such modeling attempts.

Causal modeling may be undertaken during several phases of the research process. When engaged in data exploration, the researcher is involved in a process of alternative structuring of the data set, in an attempt to more adequately understand the nature of the subject of interest. During this phase of inquiry, one immerses oneself in the data, looking for interesting ways of organizing and ordering it. Factor analysis, principal components analysis, and cluster analysis are the most often used methods of such multivariate exploration, and all of these techniques are utilized in causal modeling.

The immediate outcome of data exploration is the formulation of models with which to explain the data. Causal modeling may aid this endeavor by helping the researcher obtain the best fit between the data and the substantive theory. Rather than being guided chiefly by the statistical model being employed (ANOVA, multiple regression, etc.), the realm of theory is also considered through the choices made in the specification of the structural model(s) chosen to define the interrelations of the constructs.

Once various models have been proposed, causal modeling can be useful in the evaluation of the competing formulations. Various hypothesis may thus be tested. If the model does not statistically fit the data, then it may be rejected as a possible explanation. If it does, then it becomes one of an indeterminate number of explanations, some of which can be further eliminated by statistical comparison with each other. At the conclusion of this process the investigator may be left with one or more statistically plausable explanations for the data. Differentiation between these then becomes a matter of justification through substantive explanation.

The present study has been conceived as one involving all of the phases mentioned above. Subproblem One concerns itself with data exploration and the subsequent selection of a suitable model for later testing. This model (Likert's) is then operationalized and evaluated in Subproblem Two. Subproblem Three returns to the data exploration phase, deals with alternative models and tests the resultant hypotheses. Before proceeding with the data treatment for Subproblem One, it is necessary to briefly discuss the nature of the specific causal modeling approach utilized in the study. This is best accomplished by first embedding the analysis in its historical context, then continuing with some general tenets of causal modeling and concluding with specific considerations about the technique of choice, structural equation modeling with the LISREL IV program.

Historical Overview

As has been mentioned, econometricians and biometricians have been responsible for much of the developmental work on causal modeling using correlational data. Path analysis was introduced by the biometrician Wright (1921, 1934) in his work in genetics, economics, and psychology. He developed the path diagram and proposed the basic principles of path analysis which deal with the decomposition of correlations between variables. In the social sciences, work was stimulated by Simon's (1957) insights into spurious correlation and by Blalock's (1961, 1962, 1964, 1969) extension of these techniques into the development of testing procedures for determining the presence of linkages between variables in recursive models. Duncan (1966), returning to Wright's earlier work, was instrumental in applying the principles of path analysis to sociological theory. He urged that the simplicity of the path diagram be combined with the powerful statistical methodology derived from simultaneous specification of regression equations. By the early 1970's, many models and estimation techniques had been proposed. (Costner, 1969; Duncan, 1972; Heise, 1969a, b; Jöreskog, 1973; Keesling, 1972; Land, 1970; Wiley, 1973), but the bulk of the social science literature remained methodological, rather than substantive.

During the later 1970's, more substantive applications of structural equation modeling began to appear in education (Cooley, 1978; Maruyama, 1977; McGarvey, 1978) and organizational behavior (Dessler &

Valenzi, 1977; Franklin, 1973, 1975a, 1975b; Greene & Organ, 1972, 1973; Greene, 1973; Griffin, 1977; Hall & Schneider, 1972; Jermier & Schriesheim, 1978; Kalleberg, 1974; Organ, 1977; Sheridan & Vredenbaugh, 1979; Sims & Szilagyi, 1975; Wanous, 1974). These ranged from relatively sophisticated usage of the methodology, i.e., in building models from qualitative data (Maruyama, 1977; Maruyama & Miller, 1979; McGarvey, 1978) to the more restrictive usage of the Simon-Blalock technique (Greene & Organ, 1973; Organ & Greene, 1974).

If causal modeling continues to increase in applicability and ability to deal with complex models it will be due in large part to the work of Jöreskog and his colleagues. What had been missing in causal modeling until the mid 1970's was a general method that would routinely treat complex models across all substantive fields. Although the original method appears to have been developed simultaneously by Jöreskog (1973), Keesling (1972), and Wiley (1973), it remained for Jöreskog (1973, 1977) to provide a multipurpose computer program (LISREL) with wide utility (Jöreskog & Sörbom, 1978). LISREL will estimate the unknown coefficients in a set of linear structural equations, using either raw data, the matrix of sums of squares and crossproducts, the covariance matrix, or the correlation matrix. It will analyze both recursive and nonrecursive models, with either manifest or latent variables, and it allows for correlation of disturbances. Outputs are provided in both unstandardized and standardized formats. The program will deal with many types of substantive models, and studies using it have begun to appear in the literature (Jöreskog & Sörbom, 1976, 1977; Rock et al., 1977; Sörbom, 1978; Werts et al., 1977; Wheaton et al., 1977).

General Considerations

In this section we will present some general concepts relative to causal modeling, briefly discussing differences among the several terms used to label the techniques. The section will also deal with problems and limits to usage of the methodology. As has been previously noted, the current study employs the convention suggested by Bielby and Hauser (1977) and uses the terms "causal modeling," "path analysis" and "structural equation modeling," simultaneously. There are some slight differences between the techniques represented by these terms, however. They vary primarily in the restrictiveness of their required assumptions and in their ability to handle increasingly complex models.

The Simon-Blalock technique (Blalock, 1964) involves (1) proposing a substantive model, using a path diagram; (2) determining which linkages are missing; (3) predicting that certain of the partial correlation coefficients are zero; (4) calculating the actual value of the partial correlation, and (5) comparing (3) and (4) and deciding whether or not to omit the linkage. Based on the regression model, the technique requires that all of the assumptions associated with the general linear model be satisfied. It also requires a recursive system (one that contains no variables that are reciprocally related); that the system be overidentified; that all residuals be uncorrelated, and that independent variables be measured without error. No estimation of the parameters of the causal model are given and there are no methods by which to select among competing models. Basically, this technique is a restricted form of causal modeling, having a relatively low "cost-benefit" ratio.

It is beyond the scope of the present paper to adequately discuss the differences between ordinary path analysis and structural equation modeling. Generally, however, ordinary path analysis is more restricted than structural equation modeling, and requires the satisfaction of a greater number of assumptions. Unlike the Simon-Blalock technique, ordinary path analysis will allow the estimation of parameters and consequently, the selection between competing models. Unlike structural equation modeling, ordinary path analysis requires the input of interval data; and uncorrelated disturbances of the dependent variables. In addition, it will only deal with observed (manifest) variables[28]. Both path analysis and structural equation modeling will allow the testing of just-identified models, and both recursive and nonrecursive systems. All three of the techniques require the researcher to presume that the data are linear, that they will fit a linear model. In addition, the assumption of multivariate normality (for testing statistical adequacy of fit of resultant models) is also presumed.

The LISREL approach to structural equation modeling allows one to deal with just-determind models, recursive and nonrecursive systems, unanalyzed correlations, non-random measurement error, correlated disturbances, nonlinear associations, qualitative variables, manifest variables, and unmeasured, hypothetical construct (latent) variables. A further refinement on the LISREL model has been offered by Bentler (1976) and Weeks (1978, 1980 [in press]) who have developed a general multilevel manifest variable model to deal with measurement models containing several levels of related latent variables. Instead of manifest variables being expressed directly in terms of latent variables, the more general model allows several levels of latent variables to influence each other without having a direct effect on any manifest variable.

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[28] More advanced path analytic models are available for dealing with unmeasured variables. See Hauser and Goldberger (1971); Land (1970); and Werts, Jöreskog, and Linn (1973). These models are not operationalized in readily usable computer programs, however.

The present study has been interested in studying organizational effectiveness, a substantive field whose constructs are, for the most part, unmeasurable. job performance, satisfaction, leadership, climate, etc., are all latent variables which we presume to estimate via manifest indicators such as student absentee rates, self-reports on trust level, and so on. Many of these so-called manifest variables, especially the self-report ones dealing with leadership, climate, trust, and the peer working environment, may actually be second level latent variables, as conceived by Bentler and Weeks. Unfortunately, computer programs based on the more general latent variable models were not available at the time of this study. In addition, there is some doubt as to whether the substantive area is as yet sufficiently well understood to accurately specify the second or third level latent constructs and the relationships ocurring among them. Consequently, LISREL IV was selected as being the most appropriate technique, given its availability and the disadvantages offered by other causal techniques. A more detailed discussion of facets of the LISREL approach will be offered in later portions of this paper dealing with specific interpretations of the data treatment for Subproblems Two and Three.

In summary, the LISREL model was selected as the methodology of choice for the following reasons:

(1) One of the fundamental charges to the responsible social scientist is to contribute to the alleviation of social problems. One of the ways to best do this is to begin to clarify cause and effect relationships among various social phenomena.

(2) The preferred methods leading to causal inference are the powerful experimental and quasi-experimental designs. Unfortunately, such designs are often difficult, sometimes impossible, to employ in real-world settings. Causal modeling provides an alternative approach to causal inference, applicable to ex-post facto designs and to secondary analysis.

(3) Causal modeling can aid the development of social science theory by forcing the researcher to make explicit the substantive assumptions underlying proposed theories. It can also aid in the building and testing of various models of social behavior.

(4) Causal modeling is becoming an increasingly important methodological tool in the social sciences, but there have been very few studies to date that have applied the technique to the field of organizational behavior.

(5) Certain techniques of causal modeling, particularly the Simon-Blalock, are too restrictive and do not provide the information required for the present study. The study was designed to operationalize Likert's model of effectiveness, to test the resulting model, then to continue to explore the data by building and testing alternative models. For these purposes, estimates of the causal linkages are needed and they are not provided by the Simon-Blalock technique.

(6) The current study required: (a) that given the nature of the subject matter, latent constructs must be measurable; (b) that the methodology be able to accept a correlation matrix as data input; (c) that certain of the disturbance terms of the model would need to be correlated, in order to obtain a better fit of the model; (d) that some method of distinguishing between competing models be available. The LISREL model meets these requirements.

It is realized that so brief an overview cannot adequately treat the subject of causal modeling. The reader is advised to refer to the following sources for further detail and amplification of the topics presented here: Asher (1976), Duncan (1975), Heise (1975), and MacDonald (1977) provide introductions to modeling with manifest variables. Articles by Bentler (1978, 1980 [in press]) and Bielby and Hauser (1977) offer excellent overviews of the entire field, oriented substantively toward psychology and sociology, respectively. Kenny (1979) provides in-depth coverage of the field, assuming moderate technical expertise. Finally, Aigner and Goldberger (1977), Goldberger and Duncan (1973), and Jöreskog and Sörbom (1979) present advanced technical discussions of latent variable modeling, along with some substantive applications.

Theoretical Operationalization

Theoretical operationalization was accomplished by examination of source documents describing the theory in its several formats (Bowers, 1976; Franklin, 1973, 1975a, 1975b; Hausser, Pecorella, & Wissler, 1975; Likert, 1961, 1967; Likert & Likert, 1976; Siepert & Likert, 1973; Taylor & Bowers, 1972). As a result of this process, working definitions of the many subindices and indices were formulated.

Choice of the variables to be included as indices of the effectiveness model was a relatively simple one, once it was realized that some overlap and redundancy occurred between different interpretations of Likert's ideas, primarily due to perceived differences in the organizational characteristics of school and industrial organizations. Likert, in descriptive material to his Profile of Schools instrument (Siepert & Likert, 1973, p.4-5), clearly indicates the variables of major interest for school organizations. These variables are: Organizational Climate, Supervisory Leader Behavior, Peer Behavior, Team Interaction, Educational Performance, and Staff Satisfaction. For purposes of the present study, these became respectively: Climate, Leadership, Peer Work Environment (includes Peer Behavior and Team Interaction), Job Performance, and Job Satisfaction. In a later description of the POS (Rensis Likert Associates, 1978), Mutual Trust is added as a boundary-spanning variable, containing both causal and intervening components. This became Trust in the terminology of the present study. The indices were renamed in order to distinguish them from those used in Likert's own instruments, since his variables were inevitably modified somewhat to accommodate the data available from IDEA.

A major problem occurred at this stage of the research when it was realized that Likert's usage of the variable, Organizational Climate (Likert, 1967), did not parallel the data at hand. As has previously been noted, Likert views climate in much the same way as does Taguiri (Tagiuri & Litwin, 1968, p. 27):

> "Organizational climate is a relatively enduring quality of the internal environment of an organization that (a) is experienced by its members, (b) influences their behavior, and (c) can be described in terms of the values of a particular set of characteristics (or attributes) of the organization."

As further defined by the Survey of Organizations (Taylor & Bowers, 1972, p. 62), climate is seen as a construct, based in part on the premise that:

> "...the functioning patterns prevailing outside a given group, primarily those above it, affect corresponding functional patterns within that focal group. This impact is transmitted to a group through perceptions and information sharing... Organizational climate, therefore, denotes a set of accumulated effects of the ways in which other, primarily superior, groups actually develop."

This point of view, that climate is a cumulative variable, a function of structures, policies, and leadership behavior at progressively higher levels of the organization (i.e., at the district, school board, superintendent, state office of education levels), was not testable with SOS data. There simply were no data available on these higher organizational levels, relative to the climate construct. As a result, climate was defined in a somewhat narrower sense, following Halpin and Croft (1962) and Halpin (1966), who limit climate measures to social interactions among school staffs. Climate, as operationalized by the present study, represents the internal environment of the school, with no reference to other influences exported by higher levels of the organization. The subindices included in the climate operationalization were, however, those judged most likely to be affected by groups at the upper levels in the organizational hierarchy.[29]

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[29] This definition of climate closely parallels the concept of "group process" as defined in the SOO instruments and by Franklin (1973). Franklin's path analytic model views the group process factor as a function of organizational climate, managerial leadership and peer leadership. Causal paths run from each of these variables to the group process variable (Franklin, 1973, p. 53). The Franklin study did not, however, test alternative paths running from group process to the other factors. The possibility that group process was an independent rather than a dependent variable was not investigated and remains open to question. Franklin also did not attempt to tie his intervening variable (group process) to any end-result variables.

The subindices selected to compose the six major indices were chosen to parallel the subindices contained in both the SOO and POS instrument packages. Figure 4.2 presents a comparison between the SOO and POS subindices and variables included in the present study. Where possible, variables measuring essentially the same construct are presented adjacent to one another, as one reads across the figure. Hence, "Support," "Support by Principal," and "Leader Support" all measure very similar concepts. For purposes of simplification, only the 28 variables which were found to demonstrate adequate reliability in the present study are contained in this figure (Variables Included in Present Study). The other variables (47 in all) which were initially proposed as possible indicators are not included in Figure 4.2, but are briefly discussed later in this section.

The overlap/redundancy problem mentioned earlier is apparent from an examination of Figure 4.2. The two conceptualizations shown often give similar phenomena slightly different names and, in addition, the two versions of the Profile of Schools (Siepert & Likert, 1973; Rensis Likert Associates, 1978) themselves call for an internal restructuring of the subindices within the conceptualization. Note also the SOO variable, "Group Process," and its correspondence to the Climate variable of the present study. Finally, some variables considered necessary to one conceptualization are not contained anywhere in the others. It may also be seen from Figure 4.2 that not all possible subindices of the SOO and POS instruments were operationalized. This was due to the lack of available Study of Schooling items necessary for subindex definition. The Job Satisfaction and Job Performance indices are not totally defined by either the SOO or POS. Consequently, supplemental subindices were

FIGURE 4.2

COMPARISON AMONG THREE CONCEPTUALIZATIONS OF THE LIKERT MODEL OF EFFECTIVENESS

SURVEY OF ORGANIZATIONS^a	VARIABLES INCLUDED IN PRESENT STUDY^b	PROFILE OF SCHOOLS^c
ORGANIZATIONAL CLIMATE		**ORGANIZATIONAL CLIMATE**
Decision Making Practice		Decision Making Process
Communications Flow		
Motivational Conditions		
Human Resources Primacy		
Lower Level Influence		
Technological Readiness		
		Goal Commitment
		Team Cooperation
SUPERVISORY LEADERSHIP	**LEADERSHIP**	**CAUSAL LEADERSHIP**
Support	Support by Principal (LEADPSPT)	Leader Support
	Receptivity to Teachers Ideas (LEADIDEA)	Receptivity to Subordinate's Ideas
^{d}Leader Decision Making Practices	Principal/Teacher Decision Making (LEADPTDM)	Decision Making
Team Building	Team Building (LEADTB)	Team Building
Goal Emphasis	Goal Emphasis (LEADGOAL)	Goal Emphasis
Work Facilitation	Work Facilitation (LEADWFAC)	Work Facilitation
^{d}Leader Technical Competence		Technical Competence
PEER LEADERSHIP	**PEER WORK ENVIRONMENT**	**PEER BEHAVIOR**
Support	Reinforcing Environment (PEERENV)	Peer Support
Team Building	Peer Team Building (PEERTB)	Peer Team Building
Goal Emphasis		Goal Emphasis
Work Facilitation		Peer Help With Work

FIGURE 4.2 (Continued)

SURVEY OF ORGANIZATIONS	VARIABLES INCLUDED IN PRESENT STUDY	PROFILE OF SCHOOLS
GROUP PROCESS	**CLIMATE**	**TEAM INTERACTION**
Planning/Coordinating Decision Making/Problem Solving Information Sharing	Team Cooperation: School (CLIMCOOP) Decision Process: School (CLIMDECP)	Team Cooperation Decision Process Communications Influence Sharing
	Goal Commitment: Teacher (CLIMGOAL)	Goal Commitment
		WORK GROUP CLIMATE
Confidence & Trust In Others Motivation	Trust in Peers (PEERTRST) Conflict Resolution (PEERCONR) General Adult Working Climate (CLIMGENL)	Trust & Confidence Motivation
NON-CLUSTERED[d] ITEMS	**TRUST**	**TRUST[e]**
Supervisor Trusts Subordinants Subordinants Trust Supervisor	Trust By & In Principal (TRSTPRIN)	Trust By Leader Trust In Leader
		COMMUNICATIONS[e]
	Principal Communication (LEADCOM)	Openness Direction of Information Flow
Departmental Planning/Cooperation	Peer Communication (PEERCOM)	Accuracy Lateral Exchanges (Peer Interactions)
		OTHER INTERVENING[e]
Influence on Work Group		Influence Motivation
	Goal Consensus (JPERGOAL)	Goal Acceptance

FIGURE 4.2 (Continued)

SURVEY OF ORGANIZATIONS	VARIABLES INCLUDED IN PRESENT STUDY	PROFILE OF SCHOOL
SATISFACTION	**JOB SATISFACTION**	**SATISFACTION**
Work Group Supervisor Job Organization Rewards Progress Up To Now Future Progress	Morale (JSATMOR) w/The Organization (JSATORG) w/Reward System (JSATREW)	
	School Rating (JSATGENL) w/Influence (JSATINFL) w/Evaluation System (JSATEVAL)	Attitude Toward School Frustration Gap
	JOB PERFORMANCE	**PERFORMANCE**
	Student Drop-Out Rate (JPERDROP) Student Absence (JPERABS) Student Vandalism (JPERVAND) School Rating (JPERGRD)	Educational Achievement Cost Performance Measures Student Drop-Out Student Absenteeism Vandalism Staff Turnover

[a] Source: Hausser, D. L., Pecorella, P. A., Wissler, A. L. Survey-Guided Development: A Manual for Consultants. Ann Arbor: Institute for Social Research, 1975.

[d] Selected items not clustered into any index.

[b] See Appendix C for further explanation of these variables.

[c] Source: Rensis Likert Associates. The Profile of a School: A Resource for Improving School Administration. Ann Arbor: Author, 1978.

[e] An alternative ordering of the variables was earlier proposed in Siepert, A. F., and Likert, R. The Likert School Profile Measurements of the Human Organization. Paper presented in a symposium on Survey Feedback in Educational Organizational Development at the meeting of the American Educational Research Association, New Orleans, February, 1973.

added to these variables as suggested by a review of current literature on satisfaction and performance criteria (see especially Campbell, 1974, and Steers, 1977).

The process of item selection for those subindices that were included began with an examination of the face validity of the items. This process was facilitated by the fact that IDEA had included items chosen to measure aspects of organizational functioning similar, in many cases, to those addressed by Likert. In addition, many of IDEA's items were similar in wording to those of the SOO and POS. The majority of these were found in IDEA's "C Variables", a series of 100 items on the teacher survey Teacher Survey, p.8-10) designed to measure various aspects of the adult working environment in the school. The "C Variable" items were used extensively in the composition of the Climate, Leadership, Trust, and Peer Work Environment indices and to a lesser extent for Job Satisfaction. Teacher Job Performance was externally evaluated so, of course, no teacher survey items were included for this index. Instead, these data came from school and district office records.

Certain subindices lacked the ready correspondence between IDEA items and those used in the SOO and POS. In these cases it was necessary to select items, again attempting to maximize face validity, that came as close as possible to describing the meaning ascribed to the subindex by Likert's theory. In summary, the process of item selection was one of continuous interplay among four realms: Likert's theory, Likert's theory as operationalized by the Survey of Organizations, Likert's theory as operationalized by the Profile of Schools, and items actually available from IDEA's Study of Schooling.

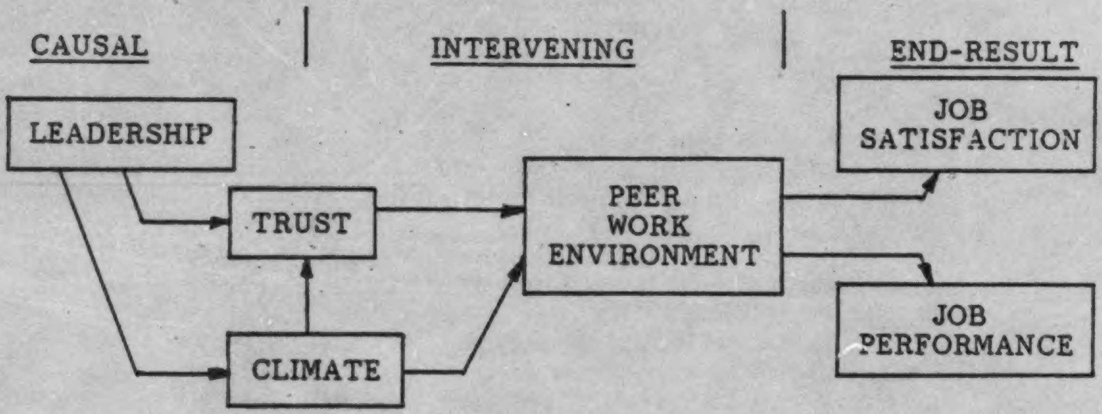
The modified (and simplified) version of Likert's model of effectiveness and the one proposed for testing in Subproblem Two is presented in Figure 4.3. The major modifications from the original model are in the ordering of the causal variables; the operationalization of Climate as a boundary-spanning endogenous variable having both causal and intervening properties; and the formation of the new index, Peer Work Environment, from the original Team Interaction and Peer Behavior indices.

It has been noted that, given SOS data, principal leadership must be treated as the primary causal variable. The behavior of the principal, in turn, affects the climate of the school and has some influence on the trust level of the staff. Climate also influences the trust level of the total organization, while at the same time setting the tone for staff interaction and for the behavior of teachers toward one another. Trust in the principal also contributes to the working relationships of the staff members. The output measures of this process are some levels of Job Satisfaction and Job Performance.

Following is a complete listing of all operational definitions for the indices and subindices selected for initial inclusion in the treatment of Subproblem One. These variables were selected after comparing the SOO and POS conceptualizations and after adding other variables selected from the literature on organizational effectiveness. The letters in parenthesis following many of the subindices are the abbreviated variable names assigned for purposes of later statistical computation. Subindices which have not been assigned variable names are those which will be deleted from the study at some point in the investigation of reliability.

FIGURE 4.3

MODIFIED VERSION OF LIKERT'S MODEL OF ORGANIZATIONAL EFFECTIVENESS IN THE SCHOOL



The IDEA items selected to measure the initial operationalization of those indices and subindices actually used in the study may be found in Appendix A.

Causal Variables

> Causal variables are those which are modifiable by school leadership, and which may, if modified, affect the course of events within the school as well as the educational results obtained by the school. The causal variables are the independent variables of the study. Causal variables may be endogenous or exogenous but in either case they are the primary variables in the causal chain. There are two causal variables, Leadership (exogenous) and Climate (endogenous).
>
> Leadership. The Leadership index deals with teacher perceptions of various aspects of principal job-related behavior. It is an exogenous variable and consists of ten subindices:
>
> (a) Support by principal. Measures extent to which principal is seen as friendly and supportive. (LEADPSPT)
>
> (b) Principal receptivity to teacher ideas. Measures extent to which principal encourages teachers to offer suggestions about both academic and nonacademic matters. (LEADIDEA)

(c) Principal goal emphasis. Measures extent to which principal encourages high goal attainment among the staff. (LEADGOAL)

(d) Principal team building. Measures extent to which principal uses group methods in problem solving. (LEADTB)

(e) Principal work facilitation. Measures extent to which principal secures needed resources, facilitates the planning process, and acts as an expert resource on school-related matters. (LEADWFAC)

(f) Principal/teacher decision making. Measures extent to which teachers feel they are involved in decisions affecting their work. (LEADPTDM)

(g) Principal communication. Measures extent to which teachers believe upward communication is adequate. (LEADCOM)

(h) Technological adequacy. Measures extent to which educational resources are available and channeled to the areas where they are most needed.

(i) Communication frequency. Measures frequency of teacher-principal communication on various job-related matters.

(j) General leadership style. Categorizes the principal's leadership style and most-often utilized basis of power.

Climate. The Climate index describes teacher perceptions of facets of the internal environment of the school. These facets are those most heavily influenced by groups at higher levels in the hierarchy. Climate is an endogenous variable and consists of five subindices:

(a) Goal commitment: school. Measures locus of performance goals. (CLIMGOAL)

(b) Decision process: school. Measures general tone of decision making procedures within the school. (CLIMDECP)

(c) Team cooperation: school. Measures extent of internal teamwork. (CLIMCOOP)

(d) General adult working climate. Measures overall rating of the organizational climate of the school. (CLIMGENL)

(e) Human resources primacy. Measures extent of concern for personal well-being of the individual staff member.

Intervening Variables

Intervening variables are the moderator variables of the study. They reflect internal states of the organization peculiar to that organization, not those generated at higher organizational levels. There are two intervening variables, Trust and Peer Work Environment.

Trust. The Trust index describes the extent to which mutual trust and confidence exists within the school, as perceived by teachers. Trust has both causal and intervening components. The subindex, Trust by and in the principal, is seen as causal because this facet of trust is built up over time by the causal activities of principals. The other, Trust in peers, is seen as intervening because it taps the trust built up over time by factors in the internal environment of the school, notably by interpersonal interactions among teachers. This index consists of two subindices:

(a) Trust by and in principal. Measures extent to which teachers perceive the principal as having trust in them and the extent to which they trust the principal. (TRSTPRIN)
(b) Trust in peers. Measures extent to which teachers trust and have confidence in other teachers. (PEERTRST)

Peer Work Environment. The Peer Work Environment index describes teacher perceptions of the interpersonal and task related behavior occurring within the school staff. This index is composed of subindices reflecting perceptions concerning various peer leadership functions (Influence on decision making, Peer team building) and group processes occuring internal to the organization. It consists of six subindices:

(a) Communication. Measures adequacy of information flow within the school staff. (PEERCOM)
(b) Peer team building. Measures extent to which teachers cooperate with and support each other. (PEERTB)
(c) Conflict resolution. Measures ways conflict situations are handled within the school staff. (PEERCONR)

(d) Reinforcing environment. Measures extent to which working in the school is seen as an intrinsically rewarding experience. (PEERENV)

(e) Influence on decision making. Measures extent to which teachers feel they have influence/control over decisions made in the school.

(f) Teacher motivation. Measures extent to which teachers feel enthusiastic about working in the school.

End-Result Variables

End-result variables are those which represent the achievements or outputs of the school. They are the dependent variables of the study. There are two end-result variables, Job Satisfaction and Job Performance.

Job Satisfaction. The Job Satisfaction index describes the extent to which teachers feel adequately compensated by various aspects of their job situation. It also expresses teacher contentment with the working environment. It consists of 13 subindices:

(a) With reward system. Measures extent to which teachers feel adequately compensated by both intrinsic and extrinsic rewards. (JSATREWD)

(b) With evaluation system. Measures extent to which teachers are satisfied with systems of teacher performance rating. (JSATEVAL)

(c) With influence. Measures extent of difference between the amount of influence teachers think they should have and the amount they believe they do have. (JSATINFL)

(d) With the organization. Measures extent to which teachers look forward to their working day. (JSATORG)

(e) Morale. Measures level of pride in and commitment to the school. (JSATMOR)

(f) General satisfaction level. A composite index of teacher satisfaction. Overall school graded A, B, C, D, F. (JSATGENL)

(g) With advancement. Measures extent to which teachers feel they have opportunities for advancement within the school.

(h) With administration. Measures extent to which teachers feel the school administration is a problem at the school.

(i) With curriculum. Measures extent to which teachers feel the school curriculum adequately meets student needs.

(j) With quality of teaching. Measures extent to which teachers feel other teachers are doing a good job in their teaching.

(k) With professional involvement. Measures extent to which career expectations are being fulfilled.

(l) With staff relations. Measures extent to which teachers feel staff relations are a problem at the school.

(m) With individual planning/teaching. Measures extent to which teachers are satisfied with various areas of their in-class job-related activities.

Job Performance. The Job Performance index describes the quality of work performed by the school, as seen by various data sources other than teachers (parents, students, archival records). It consists of 16 subindices:

(a) School rating. A composite overall rating of the school. Schools graded A, B, C, D, F, by parents and students. (JPERGRD)

(b) Student absence. Average daily student absenteeism for preceding five-year period. (JPERABS)

(c) Student vandalism. Dollar amount of student vandalism during the preceding year. (JPERVAND)

(d) Student drop-out rate. Percentage of students voluntarily withdrawing from school during the preceding year. (JPERDROP)

(e) Goal consensus. A measure of agreement on general goals for the school across various data sources (parents, students, teachers). (JPERGOAL)

(f) Post-secondary continuation. A measure of number of students pursuing further education at either the trade school, junior college, college/university, or professional school level.

(g) Student suspension/expulsion. Number of students suspended/expelled during the preceding year.

(h) Student arrests. Number of student arrests during the preceding year.

(i) Staff development. An index of school emphasis on staff professional development.

(j) Community support. A measure of community support for the school as reflected in tax revenue devoted to schools.

(k) External communication. A measure of how well information about the school is circulated throughout a portion of its external environment (parents).

(l) External participation in decision making. A measure of how much influence parents feel they have in internal school processes.

(m) Student participation in decision making. A measure of the extent to which students believe they are part of the decision making process.

(n) Teacher performance. Measures extent to which parents and students believe teachers are doing an acceptable job.

(o) Parental satisfaction with curriculum. Measures extent to which parents are satisfied with the course content of the school.

(p) Student satisfaction within the classroom. A measure of student satisfaction with classroom interaction.

At this stage, items were selected solely on the basis of their face validity. Item reliability still remained to be examined. Prior to this, however, the next step was to create a subfile from IDEA's base file that contained all of the items selected to date. Deletion of unreliable items and subindices would follow this process.

Subfile Creation

A subfile was created from IDEA's base file of teacher survey responses. Data were extracted from the base file by unique teacher identification number, using an extraction program developed by IDEA. All teacher item responses necessary for the present study were so extracted and formed the core of the subfile structure. Raw data were available from 1064 teachers in 13 high schools and 12 junior high/middle schools. The subfile was set up so that the integrity of these two levels of schooling was maintained.

Subfile Extension

Once the core raw data file was established, it was necessary to extend the subfile by the inclusion of additional data. The subfile was extended by the creation of another set of raw data and the merging of this set with the original raw data file. The new set of raw data contained three types of information: (1) individual teacher responses to interview questions concerning the adult working climate; (2) aggregated school-level data from data sources other than teachers (i.e. parents, students, archival records);[30] (3) individual and school-level data for the "Other Causal" variables of the study.[31] The result of these modifications was a case-by-case file containing individual teacher level and merged school level data.

Following this operation, certain items in the record were recoded from continuous to categorical variables (i.e. dollar rate of student vandalism recoded to high, medium, low). The length of the response scale of other items was altered to fit the more general response pattern based on a 1-6 point scale. Finally, the data were examined and errors corrected, resulting in a file containing 1064 individual records, each composed of 287 items.

Item Reliability

Due to the nature of the subproblems of this study the reliability and validity issues are closely interwoven. Our concern with the internal consistency of the variable indices is related both to questions about the reliability of the measurement instruments and to questions about the validity of the construct. Thus, attempts to secure reliable measures may also be seen as attempts to secure valid ones. As was noted earlier, however, construct validity is a major problem in the field of organizational effectiveness and is thus worthy of further consideration.

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[30] These school-level data (for instance, aggregation of student responses on items dealing with satisfaction with classroom activities and aggregation of parent response on items dealing with satisfaction with the school) were computed by hand, then keypunched and merged into each teacher's record, as appropriate.

[31] The Other Causal variables are those which represent potential alternative causal explanations for the end-result variables. These variables were extracted from the review of literature on organizational effectiveness (Bidwell & Kasarda, 1975; Campbell, 1974; Steers, 1977) and were added to the subfile in the event that alternative causal models were to be proposed and tested (see Subproblem Three).

Attempts to treat this problem in the present study are several. First, whenever possible, multiple measures of constructs are employed. Second, the initial pre-operationalization of the variables was done as a result of a careful analysis of Likert's theory. This conceptual analysis was then followed by an examination of variable items from both the Survey of Organizations and the Profile of Schools survey instruments. It is hoped that this process has resulted in a grasp of the theory sufficient to allow for informed selection of items from SOS data. Third, attitude items selected from SOS data vary as to their positive or negative wording in an attempt to reduce response bias.

The external validity of this study is limited by the adequacy of the original sampling plan. The SOS attempted to survey a heterogeneous cross section of American schools. In this regard they were only moderately successful, but their sample should still be more representative than one drawn from a more restricted population. Therefore, the present study will make no attempt to generalize to schools at large and certainly not to any other type of organization. The study is interested primarily in examining Likert's model and evaluating its usefulness as a predictive device.

The reliability of many of the items was examined using the between-groups (between schools) correlations, as supplied by IDEA. These correlations were available only by level of schooling (12 junior high, 13 senior high), not for all 25 secondary schools taken together, and only for the 100 items designated as the "C Variables." These correlations were computed using the SPSS PEARSON CORR subroutine.

The between-groups correlations were chosen for reliability purposes because of the nature of the problem under investigation. The level of analysis of the study, the school,[32] required that a corresponding set of correlations be examined. It was hoped that examination of these correlations would produce the most reliable subindices. Tables 4.1-4.10 present the intercorrelations of items ultimately selected for inclusion in the final subindex structures. As can be seen, these correlations are not complete, due to the unavailability of certain data from IDEA. These missing correlations are noted, where appropriate.

Comparison of the correlation coefficients was done with several criteria in mind. First, items provisionally detailed to a specific subindex should correlate highly among themselves. Items falling below a common range of correlation for a particular subindex were deleted. Secondly, items were selected so that the correlations internal to the subindex would be generally higher than the correlations with items external to it. A third criterion was that items selected be relatively highly correlated with other items designated for the index as a whole.

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[32] See Sirotnik 1979b for an excellent discussion of the unit of analysis question.

TABLE 4.1

INTERCORRELATIONS AMONG THE ITEMS INCLUDED IN THE VARIOUS SUBINDICES OF THE LEADERSHIP INDEX (HIGH SCHOOL)

	LEAD PSPT		LEAD IDEA		LEAD GOAL			LEAD TB		LEAD WFAC			LEAD PTDM			LEAD COM	
	C38	C61	C23	C94	C5	C35	C69	C21	C63	C1	C17	C54	C14	C34	C49	C18	C97
P C38	1.0																
C61	.58	1.0															
P C23	.58	.73	1.0														
P C94	.79	.77	.79	1.0													
C5	.38	.85	.68	.56	1.0												
P C35	.90	.69	.75	.81	.59	1.0											
P C69	.86	.69	.61	.71	.67	.87	1.0										
P C21	.95	.56	.69	.83	.43	.92	.87	1.0									
P C63	.82	.73	.63	.88	.61	.74	.82	.84	1.0								
C1	.39	.71	.51	.67	.74	.36	.53	.42	.79	1.0							
P C17	.40	.38	.50	.31	.69	.57	.58	.49	.44	.37	1.0						
P C54	.92	.62	.68	.76	.59	.93	.94	.93	.80	.46	.62	1.0					
C14	.48	.85	.55	.76	.68	.49	.53	.41	.66	.79	.17	.49	1.0				
C34	.49	.85	.49	.73	.66	.49	.52	.43	.67	.72	.20	.45	.94	1.0			
P C49	.83	.64	.61	.95	.42	.75	.70	.82	.87	.62	.26	.75	.73	.70	1.0		
P C18	.78	.51	.71	.72	.38	.90	.74	.83	.56	.12	.41	.81	.34	.30	.70	1.0	
P C97	.95	.55	.52	.73	.27	.83	.76	.88	.70	.28	.21	.79	.48	.53	.77	.72	1.0

N = 13 Schools

P = Items containing reference to principal or principal behavior.

TABLE 4.2

INTERCORRELATIONS AMONG THE ITEMS INCLUDED IN THE VARIOUS SUBINDICES OF THE LEADERSHIP INDEX (JUNIOR HIGH)

	LEAD PSPT		LEAD IDEA		LEAD GOAL			LEAD TB		LEAD WFAC			LEAD PTDM			LEAD COM	
	C38	C61	C23	C94	C5	C35	C69	C21	C63	C1	C17	C54	C14	C34	C49	C18	C97
P C38	1.0																
C61	.95	1.0															
P C23	.83	.84	1.0														
P C94	.87	.88	.86	1.0													
C5	.83	.83	.64	.79	1.0												
P C35	.87	.81	.71	.79	.82	1.0											
P C69	.71	.63	.30	.56	.66	.80	1.0										
P C21	.83	.86	.80	.82	.86	.87	.53	1.0									
P C63	.85	.89	.75	.77	.81	.82	.56	.85	1.0								
C1	.92	.90	.81	.95	.88	.82	.66	.84	.81	1.0							
P C17	.65	.57	.31	.59	.64	.73	.89	.43	.50	.59	1.0						
P C54	.89	.94	.79	.89	.86	.87	.65	.94	.89	.90	.60	1.0					
C14	.80	.83	.69	.82	.75	.65	.58	.72	.76	.92	.47	.84	1.0				
C34	.81	.85	.75	.86	.79	.75	.51	.88	.83	.92	.36	.88	.87	1.0			
P C49	.91	.93	.88	.97	.83	.84	.61	.86	.83	.97	.58	.92	.86	.90	1.0		
P C18	.78	.69	.65	.81	.70	.93	.78	.71	.74	.77	.78	.75	.60	.67	.80	1.0	
P C97	.95	.83	.72	.83	.77	.83	.76	.75	.76	.90	.67	.82	.82	.78	.84	.80	1.0

N = 12 Schools

P = Items containing reference to principal or principal behavior.

TABLE 4.3

INTERCORRELATIONS AMONG THE ITEMS INCLUDED IN THE VARIOUS SUBINDICES OF THE CLIMATE INDEX (HIGH SCHOOL)

	CLIM GOAL	CLIM DECP					CLIM COOP
	C73	C3	C8	C59	C74	C85	C89
C73	1.0						
C3	.66	1.0					
C8	.85	.91	1.0				
C59	.89	.78	.86	1.0			
C74	.76	.81	.83	.90	1.0		
C85	.81	.75	.82	.90	.96	1.0	
C89	.77	.74	.83	.93	.92	.92	1.0

N = 13 Schools

Note: CLIMGENL not included due to unavailability of data from IDEA.

TABLE 4.4

INTERCORRELATIONS AMONG THE ITEMS INCLUDED IN THE VARIOUS SUBINDICES OF THE CLIMATE INDEX (JUNIOR HIGH)

	CLIM GOAL	CLIM DECP					CLIM COOP
	C73	C3	C8	C59	C74	C85	C89
C73	1.0						
C3	.68	1.0					
C8	.71	.83	1.0				
C59	.87	.87	.83	1.0			
C74	.84	.75	.76	.86	1.0		
C85	.77	.87	.87	.89	.81	1.0	
C89	.80	.85	.87	.96	.86	.88	1.0

N = 12 Schools

Note: CLIMGENL not included due to unavailability of data from IDEA.

TABLE 4.5

INTERCORRELATIONS BETWEEN THE ITEMS INCLUDED IN THE SINGLE SUBINDICES OF THE TRUST INDEX (HIGH SCHOOL)

	TRST PRIN	
	C44	C66
P C44	1.0	
P C66	.90	1.0

N = 13 Schools

TABLE 4.6

INTERCORRELATIONS BETWEEN THE ITEMS INCLUDED IN THE SINGLE SUBINDICES OF THE TRUST INDEX (JUNIOR HIGH)

	TRST PRIN	
	C44	C66
P C44	1.0	
P C66	.84	1.0

N = 12 Schools

TABLE 4.7

INTERCORRELATIONS AMONG THE ITEMS INCLUDED IN THE VARIOUS SUBINDICES OF THE PEER WORK ENVIRONMENT INDEX (HIGH SCHOOL)

	PEER COM			PEER TB				PEER CONR	PEER ENV		PEER TRST	
	C15	C29	C78	C37	C71	C75	C79	C81	C45	C50	C68	C72
C15	1.0											
C29	.86	1.0										
C78	.56	.67	1.0									
C37	.71	.86	.83	1.0								
C71	.72	.83	.88	.92	1.0							
C75	.80	.89	.79	.92	.93	1.0						
C79	.68	.86	.77	.86	.86	.82	1.0					
C81	.83	.81	.79	.86	.85	.83	.86	1.0				
C45	.55	.56	.71	.75	.75	.79	.69	.80	1.0			
C50	.71	.86	.88	.92	.96	.90	.92	.88	.76	1.0		
C68	.77	.82	.83	.91	.95	.93	.83	.87	.78	.93	1.0	
C72	.71	.83	.85	.91	.94	.88	.94	.90	.78	.95	.95	1.0

N = 13 Schools

TABLE 4.8

INTERCORRELATIONS AMONG THE ITEMS INCLUDED IN THE VARIOUS SUBINDICES OF THE PEER WORK ENVIRONMENT INDEX (JUNIOR HIGH)

	PEER COM			PEER TB				PEER CONR	PEER ENV		PEER TRST	
	C15	C29	C78	C37	C71	C75	C79	C81	C45	C50	C68	C72
C15	1.0											
C29	.92	1.0										
C78	.59	.63	1.0									
C37	.64	.71	.86	1.0								
C71	.54	.65	.83	.90	1.0							
C75	.67	.70	.77	.90	.87	1.0						
C79	.77	.78	.84	.90	.84	.94	1.0					
C81	.82	.79	.69	.84	.78	.83	.88	1.0				
C45	.56	.62	.87	.85	.81	.92	.90	.72	1.0			
C50	.50	.54	.76	.91	.90	.84	.85	.82	.76	1.0		
C68	.55	.58	.83	.58	.64	.70	.75	.50	.86	.46	1.0	
C72	.43	.60	.69	.83	.83	.84	.75	.60	.80	.74	.56	1.0

N = 12 Schools

TABLE 4.9

INTERRCORRELATIONS AMONG THE ITEMS INCLUDED IN THE VARIOUS SUBINDICES OF THE JOB SATISFACTION INDEX (HIGH SCHOOL)

	JSAT REWD	JSAT ORG	JSAT MOR		
	C9	C83	C65	C76	C100
C9	1.0				
C83	.50	1.0			
C65	.61	.88	1.0		
C76	.80	.83	.83	1.0	
C100	.61	.86	.88	.74	1.0

N = 13 Schools

Note: JSATEVAL, JSATINFL, JSATGENL not included due to unavailability of data from IDEA.

TABLE 4.10

INTERCORRELATIONS AMONG THE ITEMS INCLUDED IN THE VARIOUS SUBINDICES OF THE JOB SATISFACTION INDEX (JUNIOR HIGH)

	JSAT REWD	JSAT ORG	JSAT MOR		
	C9	C83	C65	C76	C100
C9	1.0				
C83	.75	1.0			
C65	.73	.82	1.0		
C76	.75	.84	.88	1.0	
C100	.71	.77	.85	.85	1.0

N = 12 Schools

Note: JSATEVAL, JSATINFL, JSATGENL not included due to unavailability of data from IDEA.

An examination of the correlations presented in Tables 4.1-4.10 reveals certain features of the item set eventually utilized. Generally, the junior high intercorrelations were higher than those at the high school level. This may be due to chance, to some artifact of the statistical procedure, or it may be a reflection of some unmeasured factor unique to level of schooling. This difference in correlations at the two levels made final item selection somewhat problematic.

Study of each individual index and subindex also showed many items correlating quite highly with items originally selected to measure other factors. The Leadership index, for instance, was composed of many items referencing the principal or some aspect of the principal's behavior. It was found[33] that these items tended to correlate more highly with each other than with other items purporting to measure a construct. As a result, item intercorrelations for LEADWFAC are generally lower internally than externally and LEADGOAL items correlate lower internally than they do with LEADPSPT and LEADTB. For the Climate index, it was found that CLIMDECP items correlated very highly with items chosen to measure CLIMCOOP. There were no evident problems with the Trust index. Items selected to measure PEERCOM and PEERENV generally correlated lower internally than with most external items, while PEERTRST items correlated very highly with all other items.

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[33] "A pronounced separation occurs between principal and staff items into fairly distinct, but global clusters, in spite of our a priori intentions of writing both principal and staff items for each of our constructs. Aside from the major principal and staff item clusters, a couple of secondary clusters surface in most analysis: (a) problem-solving/decision making process and (b) staff morale/motivation/satisfaction" (Sirotnik, 1979).

For the Job Satisfaction index, it was found that JSATMOR items correlated highly with those selected for JSATORG.

It is obvious that the data exploration conducted at this stage in the research was of a highly subjective nature. Primary consideration was given to the creation of a reliable set of measures demonstrating high internal consistency within a subindex as well as relatively high consistency within the index. Items which correlated well with many other items, regardless of index, were deleted in order to maximize the creation of discrete variables. The ultimate goal, however, remained the creation of a set of measures which would operationalize the Likert theory as faithfully as possible.

Subindex Construction

After examining the reliability of the individual items, the next step was to compute provisional subindex values from these individual items. SPSS was used to accomplish this task. Frequencies were then computed for each of the subindices, again using SPSS. The frequency distributions were then examined for error and corrections were made in the subfile as necessary.

Subindex Reliability

Once the provisional subindices were computed, it was necessary to examine their reliability. This was accomplished by computing the between-groups correlations for all subindices using the SPSS subprogram PEARSON CORR. Examination of these correlations resulted in the deletion of several potential subindices, due to low intercorrelation with other subindices of the same index. Appendix B presents a summary of the correlation coefficients obtained for the 31 subindices used to construct the six major indices included in the testing of the Likert model. Note that these computations were performed on all data selected for inclusion in the present study, not just on IDEA's 100 "C" variables. Therefore, the correlation matrix includes all subindices and indices as mentioned above. A reminder--Appendix A shows the actual composition of the indices.

As was the case with individual item reliability, examination of subindex correlations for the purpose of index construction was a highly subjective process. In most cases, subindices do correlate more highly internally than externally, although there are a number of exceptions to this rule, notably, that many Climate subindices correlate equally well with Peer Work subindices, and that all Leadership subindices correlate very highly with TRSTPRIN. A possible explanation for these high correlations may be in instrument construction, since all of these subindices were composed of items taken from IDEA's "C" variables section and these items are written in similar language. In general it should be noted that correlations are uniformly high, both at the item and the subindex levels. Therefore, some overlap of variables is to be expected. This matter will be taken up again in the Limitations section, to follow.

This concludes the discussion of data treatment procedures for Subproblem One.

SUMMARY OF FINDINGS

Subproblem One was concerned with the operationalization of Likert's model and the examination of the internal consistency of the resultant structure. The research hypothesis for this subproblem was that such an operationalization could be carried out, using SOS data. If the operationalization was completed, testing of this model and/or other, alternative models would follow (at Subproblems Two and Three). As has been shown, it did prove feasable to operationalize a modified version of the Likert model.

Likert's theory was selected due to: (1) its extensive empirical grounding; (2) the closeness of fit between concepts tapped by IDEA's survey instruments and Likert's own concepts; (3) the existence of prior studies applying causal modeling techniques to the theory; (4) the usage of discrete, measurable variables, as clearly outlined by the theory.

The causal variables selected for inclusion in the present study were Leadership (an exogenous variable, measuring leader work-related behavior), and Climate (an endogenous variable, measuring those facets of the work environment most heavily influenced by upper levels of the organizational hierarchy. The intervening variables were Trust (endogenous, measuring degree of trust held for the leader by organization members, and Peer Work Environment (endogenous, measuring aspects of the work environment affected by the quality of peer relations). The end-result variables were Job Satisfaction (measuring aggregated staff satisfaction with the organization), and Job Performance (measuring the degree to which the school is performing its assigned tasks).

Structural equation modeling using the LISREL approach was selected as the data analysis methodology for several reasons. (1) It allows the researcher to infer causality from cross-sectional, ex-post facto data, such as those available for the present study. (2) There have been relatively few studies attempting to apply this methodology to the substantive fields of education or organizational behavior. The present study represents an exploratory effort to contribute to the small body of literature in this area. (3) The nature of the substantive fields called for the operationalization of unobserved constructs and the correlation of certain of the observed variables with one another. The LISREL IV program is currently the most widely available program capable of performing these operations. (4) It was desired that some method be available to allow for testing of competing models, in order to determine if one or more provide better fit to the data than others. LISREL IV offers this feature, through its chi square goodness-of-fit test.

Operationalizing the variables of Likert's theory involved a process of continuous interplay between the theory as presented in the literature and the actual data available from IDEA. This interchange resulted in three modifications. (1) The Climate and Trust variables were defined in a more narrow sense than strict interpretation of the theory would suggest. (2) The total model was modified to define Leadership as the prime causal variable. (3) Other potential causal variables were added, as suggested by the literature but not specifically included in Likert's formulation (the Other Causal variables--discussed in Subproblem Three).

Survey items were selected to form the subindex and subsequent index structures in order to approximate the items used in other Likert-based survey packages. Item reliability was examined using the between-groups correlations and items were deleted as required to achieve a compromise between high intercorrelation and high construct validity. Throughout this procedure the primary concern was with tapping the constructs underlying the emergent model. It was important to secure some evidence of empirical support, but it was also realized that the data did not lend themselves to the formation of absolutely pure subindices.

A similar procedure was followed in examining the reliability of the resulting subindices. The outcome of this process was a set of six indices designed to measure the six variables of Likert's model of organizational effectiveness.

LIMITATIONS

Several limitations must be noted in conjunction with the data treatment for Subproblem One. First, the current study analyzed previously collected data. As a result, there was no possibility of control over the data collection procedures. In addition, certain very helpful data were simply not available since they were never collected (the Job Performance variable, especially, lacks depth of measurement). The operationalization of Likert's model was also hampered by the fact that the wording of certain items may have caused the formation of unknown response sets. The high correlation among items containing reference to the principal is a case in point. Further, the generally high correlations among all items made the task of item selection more arbitrary than would have been desired.

The operationalization is also limited by the diffuseness of the literature on Likert's theory. His concepts have been adapted by many others in formats altered somewhat from the way they appear in his own writings. Further, he himself blends different variables in different configurations, depending on whether the context is school organizations or industrial ones. In addition, his theories themselves have altered over time, so that the early presentations (Likert, 1961) differ slightly from later (Likert & Likert, 1976) writings. This diffuseness made the theory difficult to pin down. Causal linkages varied from author to author, organization to organization, and over time. Perhaps the major limitation on the results of this subproblem arises from the inability of the present study to adequately conceptualize and represent the Climate construct as proposed by Likert. Climate was specified and tested primarily as an intervening variable, resembling the Group Process factor suggested by Taylor and Bowers (1972) and Franklin (1973). It proved impossible to test Climate in its more causal sense due to the lack of data. It is hoped that the configuration finally operationalized adequately portrays the spirit of the theory, if not its exact character.

CHAPTER V

THE RESULTS: SUBPROBLEM TWO

SUBPROBLEM STATEMENT

The second subproblem was to test the plausability of the postulated relationships among the variables of Likert's model as operationalized by SOS data from Subproblem One.

RESEARCH HYPOTHESIS

The research hypothesis for Subproblem Two was that the model of organizational effectiveness proposed by Likert does represent the causal relationships among the selected variables. Should this hypothesis be rejected after model testing, further models would be proposed and evaluated in a search for a model to adequately fit the data.

DATA TREATMENT PROCEDURES

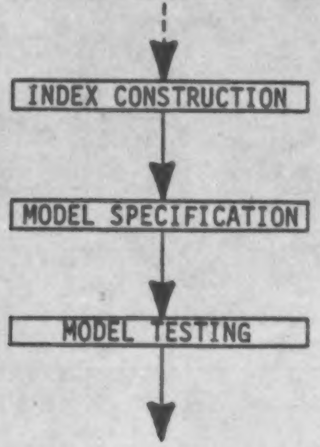
The format for presentation of the treatment of the data for this subproblem will again parallel the structure presented earlier in Figure 3.1. Those portions of Figure 3.1 relevant to the discussion of Subproblem Two are reproduced on the following page.

Index Construction

There are 31 subindices presented in Appendix A, which defines the item-by-item composition of the available subindices and indices. Of these, 24 were selected as possible indicator variables for the model to be tested in Subproblem Two. The three Other Causal variables were

FIGURE 5.1

DATA TREATMENT PROCEDURES - SUBPROBLEM TWO



not selected since they were not originally part of the Likert model; four of the Job Performance variables were deleted because it was believed that a single global predictor of the overall performance of the school was the most appropriate means for tapping the performance construct. A listing of these 24 constructs, their means, and their standard deviations may be found in Table 5.1. For the item-by-item composition of these subindices, the reader is referred again to Appendix A.

TABLE 5.1

MEANS AND STANDARD DEVIATIONS FOR 24 POSSIBLE INDICATOR VARIABLES: SUBPROBLEM TWO

Variable	Mean	Standard Deviation	Variable	Mean	Standard Deviation
LEADPSPT	4.525	0.476	PEERCOM	4.258	0.448
LEADIDEA	4.117	0.597	PEERTB	4.320	0.427
LEADGOAL	4.031	0.539	PEERCONR	4.271	0.383
LEADTB	4.228	0.471	PEERENV	3.949	0.479
LEADWFAC	4.110	0.457	PEERTRST	3.769	0.602
LEADPTDM	4.002	0.540	JSATREWD	3.936	0.579
LEADCOM	4.342	0.573	JSATEVAL	0.638	0.163
CLIMGOAL	4.305	0.424	JSATINFL	57.48	17.24
CLIMDECP	3.980	0.501	JSATORG	4.463	0.346
CLIMCOOP	3.946	0.627	JSATMOR	4.240	0.618
CLIMGENL	4.360	0.537	JSATGENL	4.400	0.688
TRSTPRIN	4.281	0.609	JPERGRD	4.310	0.513

Model Specification

At this point in the study it was necessary to select the best indicator variables to define the six latent constructs of the Likert model. Accordingly, based on both the subindex reliability investigation and upon substantive considerations, 15 variables were chosen from among the 24 noted above. The process of model specification involved (1) an examination of basic causal modeling assumptions; (2) the actual specification of the model for testing, and (3) checking the status of identification.

Basic Assumptions

The use of structural equation modeling is predicated upon the researcher reaching the conclusion that the data will fit a linear model and that they are normally distributed. The presumption of linear relationships among the variables of a model allows the researcher to measure change in one variable as a linear function of change in another.

As has been noted, the various subindices utilized in the present study are highly correlated. If the data are colinear, certain statistical problems with the correlation matrix can be created. The results of high colinearity between the variables of causal models have not as yet been examined in any detail in the social science literature, although the econometric literature has investigated the area in some detail. For present purposes, however, the technique will be considered relatively robust to the effects of colinearity (Bentler, 1978, p. 291).

The multivariate normality assumption is generally required for the testing of the adequacy of fit of models. Although not formally tested in the present study, inspection of the marginals suggested no gross departure from the multivariate normal distribution. At this time the effects of violation of this assumption are unknown. No Monte-Carlo studies have been conducted to investigate robustness, nor have studies been conducted on the effects of violation. The literature awaits such Monte-Carlo studies and, as a result, structural equation modeling is routinely conducted in violation of this assumption (Wingard, 1979). In addition to the above assumptions, it has also been assumed that the measurement instruments and the subindices constructed from them have high reliability, and that the causal assumptions of the model are substantively accurate (no specification error).

Kenny (1979, p. 22-44) suggests five steps in the process of structural modeling:

(1) Draw up a set of structural equations based on substantive theory--the structural model.

(2) Select a measurement model and a research design.

(3) If necessary, respecify the structural model as dictated by the measurement model and design requirements.

(4) Examine the identification of the model.

(5) Determine the correlations (co-variables) between the measured variables and estimate the parameters of the model (parameters existing between both manifest and latent variables).

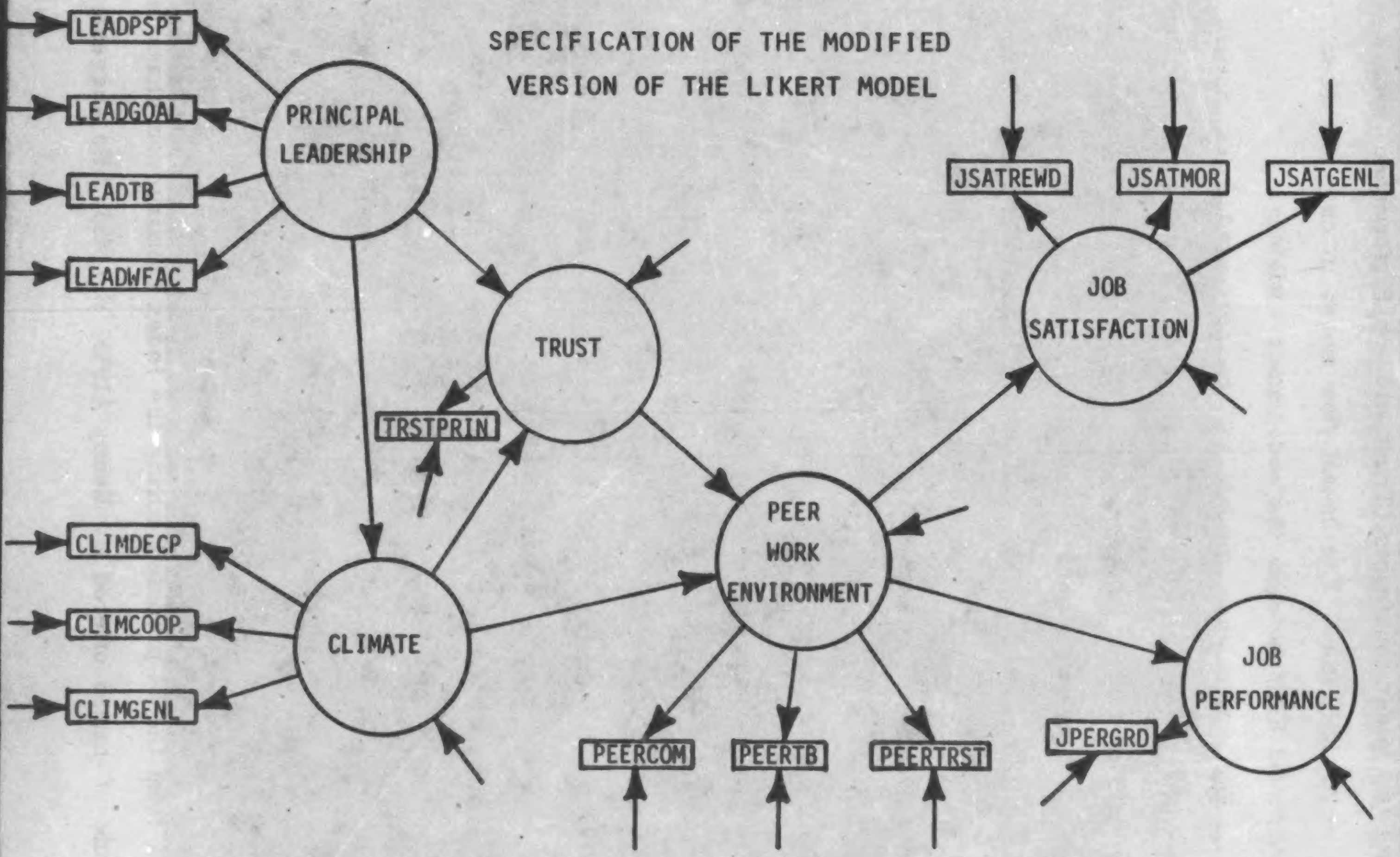
Specification

Specification involves the translation of substantive theory into a set of mathematical equations (steps [1], [2] and [3] above). Specification can be based on substantive theory, measurement theory, research design, or a blend of all three. For purposes of Subproblem Two, specification was guided primarily by the theoretical constructs and their relationships as postulated by Likert; secondarily, by measurement considerations.

Causal models have two basic components: the structural model and the measurement model. The structural model describes the causal relationships between the latent variables. It contains information on the causal effects and on the unexplained variance. The measurement model specifies how the manifest or indicator variables measure the latent variables or hypothetical constructs. It also contains information about the reliability and validity of the manifest variables. Figure 5.2 presents the specification of the causal model to be tested in Subproblem Two. This model may be categorized as a recursive mixed model. That is, it contains four latent constructs (Principal Leadership, Climate, Peer Work

FIGURE 5.2

SPECIFICATION OF THE MODIFIED VERSION OF THE LIKERT MODEL


LEADPSPT
LEADGOAL
LEADTB
LEADWFAC
PRINCIPAL LEADERSHIP
TRUST
TRSTPRIN
CLIMDECP
CLIMCOOP
CLIMGENL
CLIMATE
PEER WORK ENVIRONMENT
PEERCOM
PEERTB
PEERTRST
JSATREWD
JSATMOR
JSATGENL
JOB SATISFACTION
JOB PERFORMANCE
JPERGRD

Environment, and Job Satisfaction) measured by 13 manifest indicators and two latent constructs (Trust and Job Performance) each measured by a single indicator. The causal flow moves in only one direction with no reciprocal links between the endogenous variables.

For convenience, models will be presented using a path diagram. In the diagram observed/measured/manifest variables are contained in rectangles while unobserved/unmeasured/latent variables are enclosed in circles. Arrows indicate causal paths (parameters). A single-headed arrow indicates a possible direct causal influence of one variable upon another. Two parallel arrows with heads pointing in opposite directions (not shown in Figure 5.2 but utilized in later models) depicts a correlation with mutual causality.

The coefficient for each path represents either a regression coefficient, a covariance, or a correlation. Errors of measurement and residuals (errors in equations) are included but are not enclosed in any geometric figure. In Figure 5.2, the presence of measurement error is indicated by an arrow pointing toward the variable. An arrow directed at a latent variable represents the residual variance of that variable and a small arrow drawn towards a manifest variable represents the error term for that particular indicator.

An explication of the 15 manifest variables which compose the measurement model of Figure 5.2 is presented in Table 5.2. Variables are listed by full variable name, followed by their abbreviated designation and a brief description of their content. These 15 variables were selected from the 24 proposed during the Index Construction phase following a rule of thumb offered by Kenny (1979, p. 143). He suggests that, in

TABLE 5.2

VARIABLES COMPOSING THE MEASUREMENT MODEL OF FIGURE 5.2

Variable Name	Abbreviation	Description of Variable
Support by Principal	LEADPSPT	Measures extent to which principal is viewed as friendly and supportive. Composed of two 6-point Likert scale items ranging from 1 (strongly disagree) to 6 (strongly agree).
Principal Goal Emphasis	LEADGOAL	Measures extent to which principal encourages high goal attainment among staff. Composed of two 6-point Likert scale items.
Principal Team Building	LEADTB	Measures extent to which principal uses participative group methods in problem solving. Composed of two 6-point Likert scale items.
Principal Work Facilitation	LEADWFAC	Measures extent to which principal secures needed resources, facilitates the planning process, and acts as an expert resource on school-related matters. Composed of three 6-point Likert scale items.
Decision Process: School	CLIMDECP	Measures general tone of decision making procedures within the school. Composed of five 6-point Likert scale items.
Team Cooperation: School	CLIMCOOP	Measures extent of internal teamwork. Composed of one 6-point Likert scale item.
General Adult Working Climate	CLIMGENL	Measures overall rating of the organizational climate of the school. Composed of one structured interview item rated on a 10-point scale, ranging from 1 (most negative climate) to 10 (most positive climate), and recoded (1=1; 2,3=2; 4,5=3; 6,7=4; 8,9=5; 10=6).

TABLE 5.2 (Continued)

Variable Name	Abbreviation	Description of Variable
Trust By and In Principal	TRSTPRIN	Measures extent to which teachers perceive the principal as having trust in them, and the extent to which they trust the principal. Composed of two 6-point Likert scale items.
Communication	PEERCOM	Measures adequacy of information flow within the school staff. Composed of three 6-point Likert scale items.
Peer Team Building	PEERTB	Measures extent to which teachers cooperate with and support each other. Composed of four 6-point Likert scale items.
Trust in Peers	PEERTRST	Measures extent to which teachers trust and have confidence in other teachers. Composed of two 6-point Likert scale items.
Satisfaction with Reward Sytem	JSATREWD	Measures extent to which teachers feel adequately compensated by both intrinsic and extrinsic rewards. Composed of one 6-point Likert scale item.
Morale	JSATMOR	Measures level of pride in, and commitment to the school. Composed of three 6-point Likert scale items.
General Satisfaction Level	JSATGENL	Measures teacher satisfaction with all aspects of the school. Composed of grade given to school by teachers, ranging from A to Fail and recoded (Fail=1; D=2; C=3.5; B=5; A=6).
School Rating	JPERGRD	Measures parent and student evaluation of all aspects of the school. Composed of grade given to school by parents and students, ranging from A to Fail.

deciding on the number of indicator variables required for measuring a latent construct, one indicator will suffice in some cases; two indicators are acceptable, three are better, and four is optimum. More are fine, but are not needed. Consequently, the four most highly correlated Principal Leadership variables (out of seven possible) were selected, as were three of four Climate variables, three of five Peer Work variables, and three of six Job Satisfaction variables. The unmeasured construct, Trust, was indicated by the single variable believed to best tap the level of trust and confidence extant in the school. Job Performance was indicated by the single variable believed to best represent an outsider's perception of the school's performance.

Identification

Following model specification it was necessary to examine the identification of the model (Kenny's step [4]). A thorough discussion of the identification problem is beyond the scope of this study.[34] Briefly, however, the identification problem involves the estimation of the unknown parameters of a model from known correlations among the variables. A necessary but not sufficient requirement to cause a model to be identified is that the number of correlations be equal to or greater than the number of causal parameters. This is called overidentification. A model is said to be underidentified when the number of parameters is greater than the number of correlations; a model is just-identified when the number of correlations and the number of parameters are equal. Only if a model is overidentified may any of the parameters of the model be tested.

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[34] Such a discussion is presented in Bielby and Hauser, 1977, p. 149-150; Heise, 1969, p. 52-57; and Kenny, 1979, p. 34-41, 134-136.

Since it is often difficult to determine whether a model or a specific parameter is identified, Jöreskog and Sörbom (1978, p. 11) have proposed an empirical solution to the problem. They suggest that a positive definite information matrix almost certainly implies that the model is identified. If the matrix is singular, the model is not identified. In other words, the matrix cannot be inverted and therefore, no LISREL solution is possible. This is indicative of a probable identification problem or specification error. Since the LISREL IV program has been employed in the present study, we will accept the Jöreskog and Sörbom solution.

The final step (step [5]) in the process of structural modeling is to determine the correlation between the variables and to estimate the parameters of the model. A discussion of how this was accomplished will be presented in the following section.

Model Testing

Before presenting the results of the model testing for this subproblem, it may be useful to digress for a moment and discuss certain features of the LISREL model which will aid in the interpretation of the findings. LISREL, a restricted factor analytic model, uses maximum likelihood estimation procedures to estimate the parameters of the causal system. The measurement model uses a confirmatory factor analytic model to relate the indicator variables to the unobserved constructs. The unobserved variables are then related to each other by linear structural equations. Input into the program can be in the form of raw data, a matrix of sums and crossproducts, a covariance matrix, or a correlation matrix. The program provides the user with two general methods for evaluating the goodness of fit of a model to the data: (1) The chi square (χ^2) test for overall goodness of fit, and (2) the critical ratio formed by the LISREL path estimate divided by the standard error for that estimate (for a particular parameter).

The chi square statistic allows one to test whether the model actually accounts for the data or simply represents chance correlation. A large χ^2, compared to the degrees of freedom, indicates a poor fit with the data. A small χ^2 indicates a better approximation to the causal system under investigation. In addition to the χ^2 statistic and the degrees of freedom, LISREL also reports the probability level of the test based on the following logic:

> H_o: The model fits the data. The model as specified accounts for all of the observed covariation; or a random covariance matrix would not be fitted as well as the observed covariance matrix; or the population covariance matrix (from which the sample was drawn) is structured as specified by this model.
>
> H_1: The model does not fit the data. The model does not account for all observed covariation or the population covariance matrix may have any structure.

A nonsignificant χ^2 ($p<.05$) is indicative of a failure to reject H_o (the hypothesis of theoretical interest). In other words, the higher the reported probability level, the better the fit of the model to the data. Competing models that are subsets of an original model may be evaluated by examining the difference in χ^2 values between the two. This statistic is also a χ^2 statistic and can be used to test the importance of the parameters distinguishing the models. A large χ^2 indicates that the parameter is an important one, while a small χ^2 indicates that it is not.

A second method of evaluating the fit of a model involves scrutiny of the various estimated parameters. Dividing the LISREL estimate of the parameter by its standard error produces the Critical Ratio (C.R.). If the C.R. is large, the parameter is necessary to the model, if small, probably unnecessary. The critical ratios have an approximately normal distribution, so they may be examined using the Z probability distribution. Various standards of acceptability have been proposed, with some investigators requiring the estimate to equal at least twice its standard error, while others accept the .05 or .10 levels of significance.[35] The present study uses the former criterion, while keeping in mind the caveat (Leamer, 1978) that small sample size generally calls for lower probability levels ($p<.05$ or .01).

Models may be modified in the search for a better fit by (1) eliminating unnecessary paths; (2) adding paths as determined from examination of the residuals; or (3) correlating certain substantively acceptable error terms. After any of these modifications are made, the model is then reestimated, reevaluated, and so on. A word of explanation about the adding of new paths and correlations may be in order here. If a residual is large, it is indicative of a missing path, the inclusion of which would help the fit of the model. Correlation of certain error terms depends on the substantive rationality of the procedure. The errors should not be correlated simply to achieve a more accurate, empirically based fit. When using either of the procedures for adding paths, a drop in the χ^2 statistic, relative to the original model, indicates a better fit. A large drop, relative to degrees of freedom, indicates a real improvement. A small drop, i.e. one close to the number of degrees of freedom changed, is a sign that the modification may simply be capitalizing on chance and not represent a better approximation of the model to the data.

---

[35] Unlike the chi square statistic for goodness of fit of the entire model, a $p<.05$ or .10 is accepted as indicative of a fitting parameter.

Let us now return to a more specific discussion of Subproblem Two. As has been noted, one of the data input methods to the LISREL program is a correlation matrix. The correlational input for this subproblem may be found in Table 5.3. The table contains the correlation coefficients, means, and standard deviations for the 15 subindices selected to measure the modified Likert model.

The original model (Figure 5.2) was tested with no correlated errors and resulted in a χ^2 (85) = 189.1358 with $p<0.0001$. This χ^2 was quite high, therefore, the probability of this being a correctly fitting model was very low. After examination of the LISREL estimates it was discovered that one indicator variable (JSATMOR) had a negative variance estimate.[36] Consequently, the variable was fixed at 0 and the model retested: the χ^2 (86) = 191.1413, $p<0.0001$.

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[36] This is an illegitimate solution. Wingard (1979) suggests that such a solution may occur for any of several reasons: (1) The distributional properties of the variable may be poor (the multivariate normality assumption may be in violation). (2) The model is misspecified (the data are forced into an incorrect model; the only way the program is able to find a solution is to produce illegitimate numbers). (3) The model may not be identified. (4) None of the above (actual reason not known).

The practical way to deal with negative variance estimates is to fix the variable at 0 and refit the model (Jöreskog, 1977).

TABLE 5.3

CORRELATIONS, MEANS & STANDARD DEVIATIONS FOR THE 15 VARIABLES SELECTED FOR THE SPECIFICATION OF THE LIKERT MODEL (SUBPROBLEM TWO)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
(1) LEADPSPT	1.000														
(2) LEADGOAL	0.881	1.000													
(3) LEADTB	0.899	0.856	1.000												
(4) LEADWFAC	0.867	0.933	0.851	1.000											
(5) CLIMDECP	0.840	0.859	0.780	0.832	1.000										
(6) CLIMCOOP	0.754	0.712	0.647	0.676	0.940	1.000									
(7) CLIMGENL	0.763	0.705	0.581	0.717	0.864	0.875	1.000								
(8) TRSTPRIN	0.865	0.821	0.748	0.788	0.802	0.720	0.709	1.000							
(9) PEERCOM	0.663	0.684	0.551	0.612	0.830	0.830	0.716	0.710	1.000						
(10) PEERTB	0.708	0.698	0.596	0.662	0.896	0.924	0.836	0.690	0.881	1.000					
(11) PEERTRST	0.631	0.596	0.489	0.555	0.823	0.875	0.755	0.690	0.853	0.934	1.000				
(12) JSATREWD	0.821	0.834	0.831	0.798	0.810	0.699	0.656	0.635	0.596	0.679	0.549	1.000			
(13) JSATMOR	0.791	0.773	0.683	0.779	0.935	0.908	0.884	0.715	0.754	0.886	0.862	0.752	1.000		
(14) JSATGENL	0.765	0.772	0.677	0.825	0.827	0.702	0.783	0.626	0.594	0.681	0.657	0.738	0.889	1.000	
(15) JPERGRD	0.620	0.671	0.461	0.669	0.632	0.531	0.609	0.536	0.533	0.492	0.545	0.493	0.716	0.765	1.000
MEAN	4.525	4.031	4.228	4.110	3.960	3.946	4.300	4.281	4.258	4.320	3.769	3.936	4.240	4.400	4.310
STANDARD DEVIATION	0.476	0.539	0.471	0.457	0.501	0.627	0.537	0.609	0.448	0.427	0.602	0.579	0.618	0.688	0.513

After examination of the residuals, it was decided to add a path from Job Satisfaction to Job Performance. This resulted in χ^2 (85) = 180.1093, $p<0.0001$, a slight, but not substantial, improvement. Next, an additional path was added from Principal Leadership to Job Performance, producing a χ^2 (84) = 178.9752, $p<0.0001$. This drop was quite close to the drop in degrees of freedom and was probably the result of chance occurrence in the data.

It became apparent that the goodness of fit tests indicated that this series of models did not fit the data. Generally, χ^2 values of three times the degrees of freedom indicate that a poorly fitting model is being evaluated. It would certainly have been possible at this point to begin correlating various error terms. Undoubtedly, adding a sufficient number of correlated errors would have resulted in some fit of the model to the data. This is true of any hypothesized model--a statistical fit can be obtained by adding a large enough number of such correlations. Unfortunately, such a saturated model has little substantive utility. The larger the number of correlated errors, the more difficult it becomes to interpret the model. The number of correlations required in the present case would have obscured the structural model and made interpretation very uncertain.

Given the above results, it was concluded that the Likert model of organizational effectiveness, as modified and operationalized for the present study, did not adequately fit the data. Accordingly, further investigation was needed to produce a model or models that would provide a more powerful explanation. The search for alternative models will be discussed in Subproblem Three.

SUMMARY OF FINDINGS

Subproblem Two was concerned with specification and testing of the model as operationalized in Subproblem One. The research hypothesis was that this model of organizational effectiveness, originally proposed by Likert and slightly modified for the present study, could best represent the causal relationships among the selected variables. This hypothesis was not supported. The results of the chi square goodness of fit tests of the six-variable latent models using the LISREL IV program showed that these models, as specified, did not fit the data.

The process of testing the models involved selecting indicator variables so as to best specify the measurement model. Fifteen subindices were chosen, based on their high construct validity and upon their high correlation with the other subindices chosen to measure a given index. It was shown that the data base was such that it allowed the basic structural equation modeling assumptions of linearity and multivariate normality to be either met or considered as robust to violation. The path diagram representing the original model proposed for testing in this subproblem was presented in Figure 5.2. A description of the indicator variables of the model appeared in Table 5.2.

The identification problem was then discussed, with this study accepting the Jöreskog and Sörbom (1978) solution: That a positive-definite information matrix implies at least a just-identified model. After a discussion of methods of testing competing models and of model modification, a series of six-factor models was proposed and evaluated. All of these models had very large χ^2's and this was taken as evidence that the models did not adequately fit the data.

LIMITATIONS

Limitations on the results obtained from Subproblem Two are fourfold:

(1) The current study has conducted a secondary analysis of data collected for other purposes. A typical problem with secondary analysis is that the researcher is forced into the position of examining a particular theory with data collected for altogether different reasons. In the present case, instrument items were not designed with assessment of these causal models in mind. Consequently, the constructs chosen for representation in the models may not be adequately measured by items contained in the assessment instruments.

(2) The manifest variables may not be substantively adequate. This can result in theoretically impoverished causal models. Without the items to measure certain latent constructs those constructs either cannot be included in the model at all or, if they are included, they will be inadequately defined.

(3) There is a high degree of internal correlation between the manifest variables (subindices). In the specific case of the IDEA instruments, items were chosen to be maximally internally consistent. Consequently, it should come as no surprise that independent constructs defined by subsets of these items are also highly correlated. This leads back to the earlier discussion of colinearity and the possibility of bias introduced by highly correlated data.

(4) The sample size (N = 25 schools) is relatively small. This last limitation is something of a two-edged sword. To date, there is no satisfactory answer to the question of adequate sample size in causal modeling (Bentler, 1980). Simultaneous equation theory has only been

developed for large samples and its relevance to small samples is unknown. What is known, however, is the effect of sample size on the ability to accept or reject certain models based on the chi square goodness of fit test: With a small enough sample it will be almost impossible to reject any causal model; conversely, with extremely large samples, it will be very difficult to avoid rejecting a model.

INTERPRETATION

Bearing in mind the limitations noted above, we turn now to a discussion of the findings of this subproblem. The results of the model testing procedures carried out on the Likert model (Figure 5.2) suggest three possible explanations: (1) That the measurement model, as specified, is adequate, but that the structural model itself is faulty. (2) That the structural model is adequate but the measurement model is in error. Or (3) that both the measurement and structural models are inadequate.

It is difficult to accept the first explanation, that the measurement model was correctly specified while the structural model was not. As has already been noted, the data for this study were not initially collected to measure these variables. The IDEA items selected, while appearing to have high construct validity, may not actually be tapping the six unmeasured constructs as proposed by Likert. They could be tapping, instead, any number of other unmeasured variables. Indeed, one possible reason for their generally high intercorrelations may be that one global construct underlies them all. Whether or not this is the case, there seems to be a reasonable doubt as to the adequacy of the measurement model.

What of the structural model? Likert has proposed a six-factor causal model that specifies certain variables as causes of certain others. This model, originally proposed in 1961 (Likert, 1961), has been examined in various ways by numerous researchers. While the evidence remains equivocal, there certainly is a great deal of data which supports the basic structure of the model (Belasco, 1973; Bernhardt, 1972; Bowers, 1976; Byrnes, 1973; Franklin, 1973, 1975a, b; Lepkowski, 1970; Mangee, 1976; Shaw, 1976; Smith, 1975).

In any case, as Kenny (1979, p. 7-8) notes: "The central ideas or driving themes of theory are not usually causal laws but are more likely images, ideas, and structures...Many of the important ideas of natural science are not causal but are pictures of a process." Perhaps the causal sequencing of the constructs is irrelevant. It is the constructs themselves and the organizational realities implied by them that are the essence of the theory.

The second explanation noted above suggests that the measurement model is in error and the structural model is correctly specified. It is agreed that there is some doubt about the adequacy of the measurement model, as we have already noted. Unfortunately, despite the previous comments concerning the large body of prior substantive work relative to the theory, there is also reason to question the fit of the structural model. This is because the several models tested in Subproblem Two failed to give any promise of providing a meaningful fit to the data. Despite the fact that small sample size generally makes models easier to fit, it appeared that only by correlating a large number of errors could the model be applied to these data.

The third explanation is therefore most plausible: Both the measurement and structural models are inadequate, each to some unknown degree. Acceptance of this explanation suggested that both components of the causal model should be reworked. While performing this respecification it was desired to maintain as many of the concepts originally proposed by Likert as possible. Accordingly, it was decided that alternative models would be specified based on Likert's theory of organizational effectiveness. Additional constructs would be added only to adapt the model more closely to school organizations. Lastly, a constraint on the measurement model respecification was imposed by the secondary data analysis in that only a limited pool of reliable indicator variables was available. The task of Subproblem Three thus became one of building alternative, substantively reasonable models based on the Likert formulation. Additionally, these models had to be measurable, given the available data base.

CHAPTER VI

THE RESULTS: SUBPROBLEM THREE

SUBPROBLEM STATEMENT

The third subproblem was to propose and test alternative causal models which incorporate selected variables from the original Likert model as examined in Subproblem Two.

RESEARCH HYPOTHESIS

The research hypothesis for Subproblem Three was that one or more alternative causal models would better represent the causal relationships among the available variables than would the original model from Subproblem Two.

DATA TREATMENT PROCEDURES

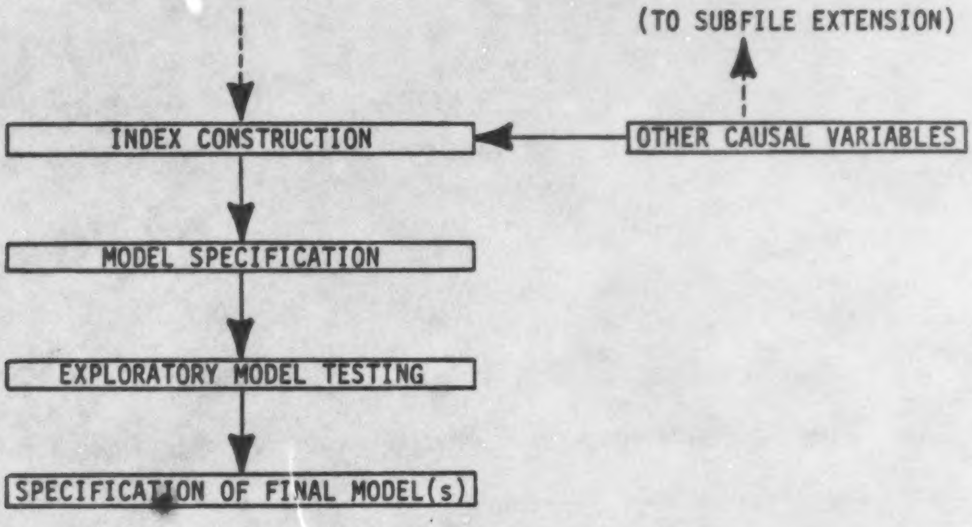
The format for treatment of the data for this subproblem will once more parallel the original structure of Figure 3.1. Those portions of Figure 3.1 relevant to the discussion of Subproblem Three are reproduced on the following page.

Index Construction

The process of restructuring the models for testing began with a review of the results from Subproblem Two and an examination of the correlation matrix presented in Appendix B. Following this review, two major conclusions were reached regarding the structural model. (1) The Climate and Peer Work Environment indices appeared to tap the same

FIGURE 6.1

DATA TREATMENT PROCEDURES - SUBPROBLEM THREE


(TO SUBFILE EXTENSION)
INDEX CONSTRUCTION
OTHER CAUSAL VARIABLES
MODEL SPECIFICATION
EXPLORATORY MODEL TESTING
SPECIFICATION OF FINAL MODEL(s)

construct. Correlations among the various subindices were such that these two indices could very well be measuring the same factor. (2) The Trust index was probably not a discrete index, but rather part of the Principal Leadership construct. Correlations between TRSTPRIN and the seven Principal Leadership subindices are very high. Substantively, trust in the leader may be considered just another dimension of the Principal Leadership variable.

Regarding the measurement model, it followed that if the structural model needed to be respecified, then the measurement model would also need to be reworked. Taken together, these conclusions led to the decision to perform an exploratory factor analysis in order to determine the indicator variables for the model specification of Subproblem Three. Such an analysis was conducted, based on the a priori selection of four major latent constructs (Leadership, Internal Work Environment [containing Climate and Peer Work Environment variables], Performance, and Satisfaction)[37] and including a fifth set of variables that consisted of unrelated causal factors (Other Causal). Thirty subindices, of the 31 presented in Appendix C, were selected for inclusion in the factor analysis. PEERENV was deleted because it appeared to be redundant with JSATREWD. A listing of the 30 subindices, their means, and their standard deviations is found in Table 6.1. For item-by-item composition of these subindices, the reader is referred again to Appendix A.

Results of the factor analysis are presented in Appendix C (N=25). An examination of these results shows that the five factor solution accounts for 81.7% of the total variance; this suggests that the inclusion of additional factors would contribute little toward further explanation. In addition, it can be seen that two factors clearly emerge, factor 1 (corresponding to Internal Work Environment) and factor 2 (corresponding to Leadership). Factors 3 and 5 are less distinct but correspond roughly to Satisfaction and Performance, respectively. Factor 4 contains loadings from all sources, including the Other Causal. Finally, the factors are moderately correlated, with factor 4 being negatively correlated with the rest.

Other Causal Variables

Other causal variables were suggested by the review of the organizational effectiveness literature. These variables represent alternative

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[37] These constructs have been renamed in order to avoid any possible confusion with the latent constructs specified and tested in Subproblem Two.

TABLE 6.1
MEANS & STANDARD DEVIATIONS FOR 30 POSSIBLE INDICATOR VARIABLES: SUBPROBLEM THREE

Variable	Mean	Standard Deviation	Variable	Mean	Standard Deviation
LEADPSPT	4.525	0.476	PEERTRST	3.769	0.602
LEADIDEA	4.117	0.597	JSATREWD	3.936	0.579
LEADGOAL	4.031	0.539	JSATEVAL	0.638	0.163
LEADTB	4.228	0.471	JSATINFL	57.48	17.24
LEADWFAC	4.110	0.457	JSATORG	4.463	0.346
LEADPTDM	4.002	0.540	JSATMOR	4.240	0.618
LEADCOM	4.342	0.573	JSATGENL	4.400	0.688
CLIMGOAL	4.305	0.424	JPERGRD	4.310	0.513
CLIMDECP	3.980	0.501	JPERABS	0.077	0.031
CLIMCOOP	3.946	0.627	JPERGOAL	111.2	52.8
CLIMGENL	4.360	0.537	JPERVAND	2.558	1.503
TRSTPRIN	4.281	0.609	JPERDROP	0.046	0.058
PEERCOM	4.258	0.448	SES	2.52	0.872
PEERTB	4.320	0.427	GOALCLAR	4.733	0.317
PEERCONR	4.271	0.383	ENV	1.400	0.500

causal factors which may have an impact on one or both of the end result variables of the model to be tested in Subproblem Three. The items composing the Other Causal variables are both individual-level and school-level items. The operational definitions of all suggested Other

Causal variables follow. The IDEA items selected to measure those variables included in the subproblem may be found in Appendix A.

Other Causal Variables (School Level)

School SES. Socioeconomic status of the area in which the school is located and from which students are drawn (from low to high) [SES].

Environmental Turbulence. Examines the political "climate" of the community surrounding the school organization (ENV).

Geographic Location. Physical location of the school (rural, rural/suburban, suburban, urban).

School Size. Size of the school (small, medium, large).

Faculty Ethnicity. Racial composition of school faculty (mostly white, mixed, mostly non-white).

Student Ethnicity. Racial composition of student population (mostly white, mixed, mostly non-white).

Faculty Sex. Male/female mix of school faculty.

Education Level. Percent of school faculty holding a Masters Degree or higher.

Salary. Median salary of school faculty.

Unionism. Union vs non-union affiliation of school faculty.

Other Causal Variables (Individual Level)

Goal Clarity. Extent to which faculty members are clear on job goals and duties.

Non-instructional Duties. Attitude toward required non-instructional activities (yard supervision, etc.) by the faculty member.

Professionalism. Extent to which educational organizations affect the faculty member's working conditions and professional growth.

Supplemental Income. Extent to which the faculty member holds other paying jobs.

Professional Involvement. Number of educational organizations belonged to by the faculty member.

Extracurricular Contact with Students. Extent of regularly scheduled non-teaching contacts with students by the faculty member.

Sex. Sex of the faculty member.

Salary. Salary of the faculty member.

Education. Educational degrees held by the faculty member.

Years Teaching. Number of years teaching experience of the faculty member.

Tenure. Number of years worked in the school by the faculty member.

Age. Age of the faculty member.

Marital Status. Marital status of the faculty member.

Ethnicity. Racial/ethnic background of the faculty member.

Occupational Level. Whether or not the faculty member is a department head.

Department. The school department to which the faculty member belongs.

Variable selection proceeded in the same way for the Other Causal variables as it did for the indices constructed in Subproblems Two and Three. Correlations were computed between all potential Other Causal variables and the various subindices used in the model specified in Figure 6.2. As a result of this process, only School Socioeconomic Status and Environmental Turbulence appeared to correlate in a systematic way with the other subindices. These variables are actually used in the current model specification process.

Model Specification

Fourteen subindices were selected as the indicator variables for the basic model to be tested in Subproblem Three. Those variables loading highest on a particular factor were generally selected as the best indicators of that factor. However, attention was also paid to the substantive implications inherent in selection of certain of the variables, with a compromise occasionally being reached wherein higher factor loadings were sacrificed to obtain a more coherent theoretical structure.

The assumptions of causal modeling, i.e., multivariate normality and instrument reliability, are again presumed to have been satisfied. The identification problem will likewise be treated as it was in Subproblem Two, with a positive definite information matrix taken as evidence of model identification.

Figure 6.2 presents the specification of the basic causal model to be tested in Subproblem Three. This model is a recursive[38] latent one containing four unobserved constructs (Leadership, Internal Work Environment, Satisfaction, and Performance) measured by 14 manifest indicators. The model proposes that the principal's leadership style and leader behavior has a direct effect on the school's internal working environment, that is, upon the level of trust, cooperation and ease of communication occurring among the teaching staff.[39] Principal leadership also indirectly affects the satisfaction level of the school staff and the performance of the school as an organization. This impact is mediated by the prevailing work environment, which arises partly from leader behaviors and partly from internal relations of the staff with one another. School performance and staff satisfaction are related in some way, although the exact nature of their relationship is not specified.

Table 6.2 presents the detailed description of the 14 manifest variables composing the measurement model of Figure 6.2. Variables are listed by full variable name followed by their abbreviated designation and a brief description. Also included in Table 6.2 are descriptions of the two Other Causal variables used in later specifications of the model.

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[38] Although there are reciprocal paths from Satisfaction to Performance, this model is not a non-recursive one. Both of these paths are constrained to equality and, hence may be considered to be correlated.

[39] This Internal Work Environment construct is very similar to the Group Process variable examined by Taylor and Bowers (1972) and Franklin (1973, 1975a, b).

FIGURE 6.2
SPECIFICATION OF THE
ALTERNATIVE MODEL (SUBPROBLEM THREE)

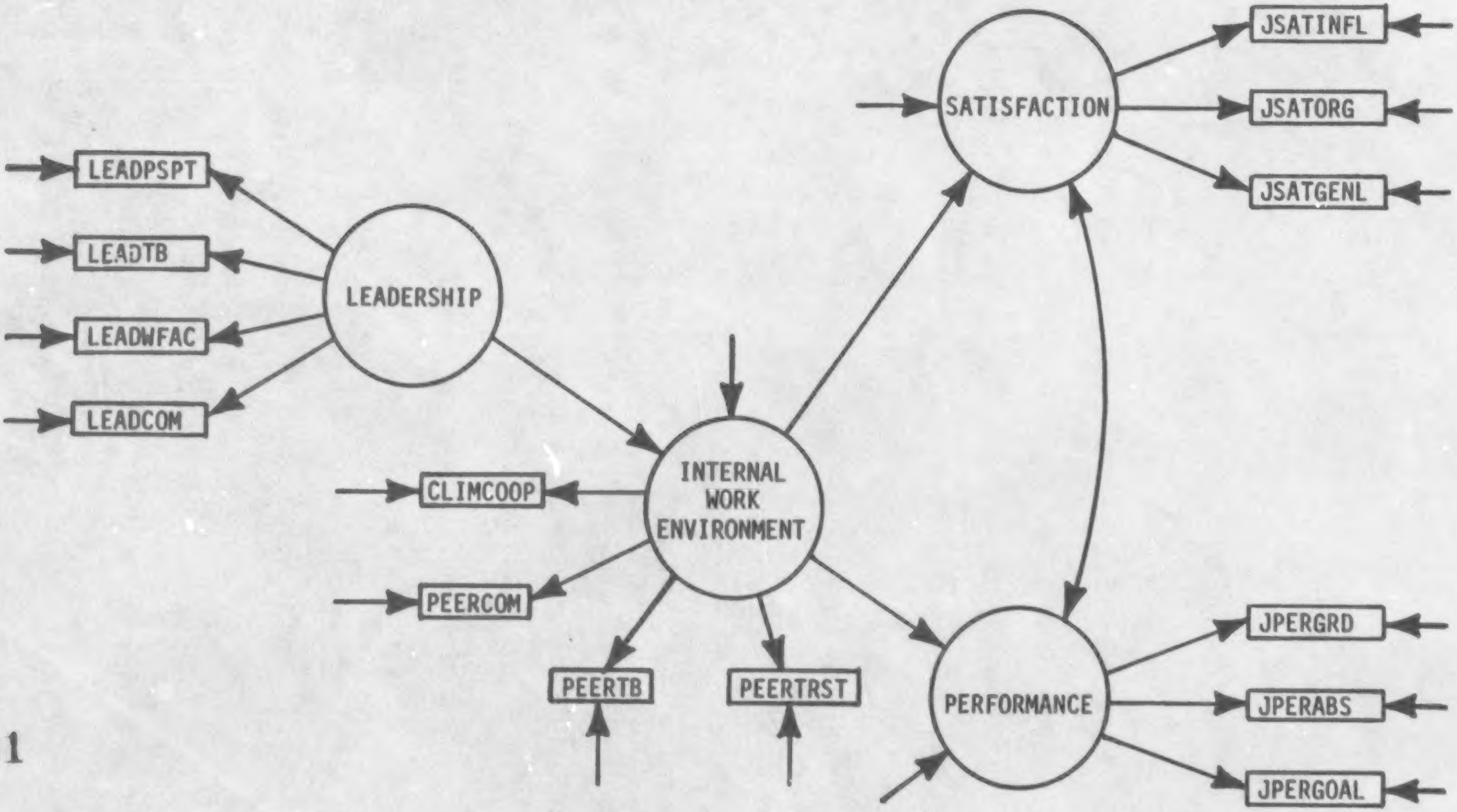
JSATINFL
SATISFACTION
JSATORG
JSATGENL
LEADPSPT
LEADTB
LEADERSHIP
LEADWFAC
LEADCOM
CLIMCOOP
INTERNAL
WORK
ENVIRONMENT
PEERCOM
PEERTB
PEERTRST
PERFORMANCE
JPERGRD
JPERABS
JPERGOAL

TABLE 6.2

VARIABLES COMPOSING THE MEASUREMENT MODEL OF FIGURE 6.2

Variable Name	Abbreviation	Description of Variable
Support by Principal	LEADPSPT	Measures extent to which principal is viewed as friendly and supportive. Composed of two 6-point Likert scale items ranging from 1 (strongly disagree) to 6 (strongly agree).
Principal Team Building	LEADTB	Measures extent to which principal uses group participative methods in problem solving. Composed of two 6-point Likert scale items.
Principal Work Facilitation	LEADWFAC	Measures extent to which principal secures needed reresources, facilitates the planning process, and acts as an expert resource on school-related matters. Composed of three 6-point Likert scale items.
Principal Communication	LEADCOM	Measures extent to which teachers believe upward communication is adequate. Composed of two 6-point Likert scale items.
Team Cooperation: School	CLIMCOOP	Measures extent of internal teamwork. Composed of one 6-point Likert scale item.
Communication	PEERCOM	Measures adequacy of information flow within the school staff. Composed of three 6-point Likert scale items.
Peer Team Building	PEERTB	Measures extent to which teachers cooperate with and support each other. Composed of four 6-point Likert scale items.
Trust in Peers	PEERTRST	Measures extent to which teachers trust and have confidence in other teachers. Composed of two 6-point Likert scale items.

TABLE 6.2 (Continued)

Variable Name	Abbreviation	Description of Variable
School Rating	JPERGRD	Measures parent and student evaluation of all aspects of the school. Composed of grade given to school by parents and students, ranging from A to Fail, and recoded (Fail=1; D=2; C=3.5; B=5; A=6).
Student Absence	JPERABS	Average daily student absenteeism for preceding five-year period.
Goal Consensus	JPERGOAL	A measure of agreement on general goals for the school across various data sources (parents, students, teachers). Composed of the absolute value of the difference in agreement on school goals.
Satisfaction with Influence	JSATINFL	Measures extent of the difference between the amount of influence teachers think they should have and the amount they believe they do have. Composed of the absolute value of the percentage difference between influence now felt and influence wanted. Index values range from 0 (no difference) to 2 (maximum difference).
Satisfaction with the Organization	JSATORG	Measures extent to which teachers look forward to their working day. Composed of one 6-point Likert scale item.
General Satisfaction Level	JSATGENL	Measures teacher satisfaction with all aspects of the school. Composed of grade given to school by teachers, ranging from A to Fail and recoded.
School SES	SES	Measures level of SES in the school attendance area. Consists of data from district building and site offices. Range from low (1) to high (4).
Environmental Turbulence	ENV	Examines the political "climate" of the community surrounding the school organization. Content analysis of data collection records was used to compose this variable (coded 1=static, 2=turbulent).

Exploratory Model Testing

The correlational input to the LISREL program is presented in Table 6.3. This table contains the correlation coefficients, means, and standard deviations for the 14 indicator variables of Figure 6.2, as well as for the 2 Other Causal variables used in later specifications of this model.

Primary Exploratory Hypotheses

The primary exploratory hypotheses of Subproblem Three were as follows:

(1) Leadership has a direct effect on Internal Work Environment.

(2) The relationship between Performance and Satisfaction is not known, but the two are correlated in some manner.

(3) Leadership has a direct effect on Satisfaction; or

(4) The effects of Leadership on Satisfaction are mediated by the Internal Work Environment.

(5) Leadership has a direct effect on Performance; or

(6) The effects of Leadership on Performance are mediated by the Internal Work Environment.

In order to examine these hypotheses, a series of models was tested and the following discussion is based on those models. Initially the model represented by Figure 6.2 was specified to have no correlated errors. Consequently, no correlated errors were included in the first LISREL run. This produced an unsatisfactory fit, χ^2 (73) = 122.0174, $p<.0001$. Subsequently, correlated errors were successively added until an acceptable fit was achieved. Nine such correlations[40] based on either

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[40] Kenny (1979, p. 24) has indicated that one of the methods for assessing the accuracy of fit of a model to the data is by counting the correlated error terms. The fewer such correlations, the more accurate the model. There are 120 possible correlations in the model as tested.

TABLE 6.3

CORRELATIONS, MEANS & STANDARD DEVIATIONS FOR THE 16 VARIABLES SELECTED FOR THE SPECIFICATION OF THE ALTERNATIVE MODELS (SUBPROBLEM THREE)

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1)	LEADPSPT	1.000															
(2)	LEADTB	0.899	1.000														
(3)	LEADWFAC	0.867	0.851	1.000													
(4)	LEADCOM	0.868	0.836	0.770	1.000												
(5)	CLIMCOOP	0.754	0.647	0.676	0.669	1.000											
(6)	PEERCOM	0.663	0.551	0.612	0.580	0.830	1.000										
(7)	PEERTB	0.708	0.596	0.662	0.622	0.924	0.881	1.000									
(8)	PEERTRST	0.631	0.489	0.555	0.563	0.875	0.853	0.934	1.000								
(9)	JPERGRD	0.620	0.461	0.669	0.403	0.531	0.533	0.492	0.545	1.000							
(10)	JPERABS	0.438	0.347	0.461	0.267	0.524	0.689	0.585	0.574	0.551	1.000						
(11)	JPERGOAL	0.311	0.185	0.211	0.136	0.573	0.515	0.489	0.613	0.497	0.473	1.000					
(12)	JSATINFL	0.654	0.671	0.605	0.537	0.788	0.619	0.785	0.669	0.376	0.469	0.441	1.000				
(13)	JSATORG	0.504	0.381	0.473	0.282	0.549	0.360	0.526	0.540	0.635	0.388	0.523	0.604	1.000			
(14)	JSATGENL	0.765	0.677	0.825	0.529	0.702	0.594	0.681	0.657	0.765	0.616	0.561	0.607	0.742	1.000		
(15)	SES^{a}	0.358	0.359	0.327	0.218	0.248	0.148	0.276	0.258	0.151	0.234	0.309	0.438	0.495	0.571	1.000	
(16)	ENV^{a}	0.337	0.248	0.362	0.109	0.390	0.271	0.426	0.492	0.583	0.286	0.407	0.434	0.660	0.473	0.115	1.000
	MEAN	4.525	4.228	4.110	4.342	3.946	4.258	4.320	3.769	4.310	0.077	1.112	57.48	4.463	4.400	2.52	1.400
	STANDARD DEVIATION	0.476	0.471	0.457	0.573	0.627	0.448	0.427	0.602	0.513	0.031	0.528	17.24	0.346	0.688	0.872	0.500

[a] These two Other Causal variables were not included in the original specification of the model presented in Figure 6.2.

substantive or measurement considerations, were eventually included in the specification of the models tested in this subproblem:

(1) JSATGENL:JSATINFL. Following Bowers (1964), and Backman, et al (1966), global predictors of satisfaction have been found to correlate significantly with measures of amount of control or influence.

(2) JSATGENL:LEADTB. Aram, et al (1971) found satisfaction positively related to measures of work group collaboration and consensus.

(3) JSATGENL:LEADPSPT. Bowers and Seashore (1966) found several measures of satisfaction correlated with leader support.

(4) JSATGENL:LEADWFAC. Bowers and Seashore (1966) also found several satisfaction measures correlated with leader work facilitation.

(5) LEADTB:PEERTRST. Primarily correlated due to measurement considerations. There is some reason to believe, however, that the encouragement of teamwork by the leader would have an impact on the trust level of subordinates with one another.

(6) PEERCOM:JPERABS. Based on measurement considerations.

(7) JPERGRD:LEADPSPT. Based on measurement considerations.

(8) JPERGRD:LEADWFAC. Based on measurement considerations.

(9) JPERGRD:JSATINFL. Based on measurement considerations.

After the nine correlated error terms had been added, a number of models was tested. Appendix D lists, in chronological order, all models tested during this phase of the subproblem. Entries for each fitting model include (a) the results of the chi square goodness of fit test; (b) the degrees of freedom; (c) the probability level of the goodness of fit test; and (d) information on the parameters specified for the model. For specified parameters, the unstandardized LISREL estimate of the path coefficient is given, for non-specified paths, a zero. Results of tests on non-fitting models include: (a) a brief notation on the reason for lack of fit; and (b) information on parameter specification. An asterisk indicates a path specified in the model, a zero is again used to indicate the absence of a parameter.

Following the addition of the correlated errors, the first model (Model 1, Appendix D, Table 1) was tested and did not converge.[41] Varying the causal linkage from Performance to Satisfaction (Models 2, 3) produced the same results. A poorly fitting model was found (Model 4: χ^2 (65) = 90.6407, p = .0195) by deleting the path from Performance to Satisfaction altogether, resulting in a model similar to the original Likert conceptualization.[42]

Continuing in the exploration of the data, a saturated model was tested (Models 5, 6) where at least one-way causality was posited among all variables. These models did not converge. Following this, the path from Internal Work Environment to Satisfaction was deleted and a series of models (Models 7-11) tested. Two of these (Model 8: χ^2 (63) = 66.2561, p=.3653; Model 9: χ^2 (63) = 66.9448, p=.3433) provided good fits but contained non-significant paths.[43]

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[41] That is, no solution was found in the first 250 iterations of the LISREL program.

[42] A comparison with Figure 5.2 shows that the structural models are identical, except that Trust has now been collapsed into Leadership and Climate and Peer Work Environment have been merged into Internal Work Environment.

The Internal Work Environment - Satisfaction path was then reintroduced and the Leadership - Satisfaction path deleted, with unsatisfactory results (Models 12, 13). Following this, the Leadership - Performance path was deleted, the Leadership - Satisfaction link returned (Models 14, 15); then the Internal Work Environment - Satisfaction path removed (Models 16, 19, 20). All models in this last series fit, with various nonsignificant paths. Two models (Models 17, 18) fit well (Model 17: χ^2 (64) = 66.5909, p=.3879; Model 18: χ^2 (64) = 67.6645, p=.3532), with essentially all paths[44] significant.

Models were compared following guidelines suggested by Bentler (1978, p. 297), in which he proposed that: (1) Models demonstrating more adequate fit (i.e., probability level higher) be considered superior. (2) If two models account for the data equally well, the more parsimonious should be considered superior. (3) The chi square test can be used to compare models that are subsets of one another. Accordingly, the chi square test was used to test various subsets (see Appendix E). Study of the data presented in this appendix revealed: (A) That the path from Leadership to Internal Work Environment was consistently significant, at least at the .05 level, for all models which could be fit. The same held for the path from Leadership to Satisfaction. (B) That the path from Leadership to Performance and the path between Internal Work Environment and Satisfaction were consistently nonsignificant.

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[43] As determined by examination of the Critical Ratios.

[44] The Performance - Satisfaction path of model 18 had a p=.054 (two-tail); p=.027 (one-tail).

The first 20 models tested were all variants of the basic model evolved from the modification of the Likert conceptualization (Figure 5.2), wherein Leadership was viewed as the primary causal variable, with Internal Work Environment serving as a mediator between Leadership and the end-result variables. Up to this point, it appeared that the causal link between Leadership and Internal Work Environment was present and that the causal flow was from the former to the latter (Exploratory Hypothesis 1).[45] The relationship between Performance and Satisfaction (Hypothesis 2) was, however, unclear. Comparison of subsets indicated that a direct causal link between Leadership and Satisfaction was probable (Hypothesis 3), while Leadership appeared to have no direct effect on Performance (Hypothesis 5). The path from Internal Work Environment to Satisfaction was likewise problematic, indicating that the effects of leadership on satisfaction may be direct, rather than mediated by the working environment (Hypothesis 4). The path from Internal Work Environment to Performance, however, did appear to be necessary, indicating that the effect of leadership on performance was somehow mediated by the working environment (Hypothesis 6).

Alternative Exploratory Hypotheses

Recent work in the field of attribution theory[46] has raised questions about certain fundamental assumptions underlying the use of cross-sectional survey methodology in studies of organizational behavior. Staw (1975), for example, has offered an alternative explanation for results obtained in studies of leadership and performance. Rather than presuming that leader behaviors and attitudes influence staff performance, he suggests that staff knowledge of performance may result in the attribution of certain characteristics to the leader. Building upon Heider's (1958) concept of naive psychology, and drawing on the work of Jones and Davis (1965), Bem (1965), and Kelley (1971), Staw experimentally replicated several leadership studies, including Likert's (1961) findings correlating group cohesiveness with high job performance. He argued that traditional explanations (leadership causes performance) do not consider the effect that perceptions of performance may have on ratings of group cohesiveness, communication, climate, leadership, etc.

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[45] Additional information concerning this hypothesis is presented in the Other Findings section of this chapter.

[46] See Farris and Lim, 1969; Ilgen and Fujii, 1976; Kerr and Schriesheim, 1974; Lord, Binning, Rush, and Thomas, 1978; Lowin and Craig, 1968; Mitchell, Larson, and Green, 1977; Staw, 1975.

Although an in-depth analysis and treatment of attribution theory was beyond the scope of the present research, it was decided to briefly examine an attribution-based theory to account for these data. Consequently, an exploratory hypothesis was proposed and tested:[47]

(7) Perceived Satisfaction causes certain behavioral characteristics to be attributed to the Leadership of the organization (attribution theory).

In order to examine this hypothesis, several models were tested. The first (Model 21) was almost identical to Model 17, the model which had provided the best fit to the data from the earlier series of models. The only difference between the two was the reversal of the Leadership - Satisfaction path. In Model 21 one-way causal links were posited from Satisfaction to Leadership, from Leadership to Internal Work Environment, and from Internal Work Environment to Performance. Reciprocal causal links were posited between Performance and Satisfaction. This model was not identified.

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[47] Most of the attribution theory literature has examined the leadership - performance causal path, although Ilgen and Fujii (1976) report similar findings for leadership - satisfaction data. Based on the results obtained from the test of exploratory Hypothesis 5 (rejection of the direct effect of Leadership on Performance), however, it was decided to test only the directionality of the Leadership - Satisfaction causal link.

Next, in an attempt to explore both the attribution hypothesis and the relationship between Leadership and Performance, a model was examined which dropped the Leadership - Satisfaction path and added reciprocal paths between Leadership and Performance. This model (Model 22), containd very large standard errors, hence did not fit the data.

Finally, a third model was tested. Model 23 proposed a causal link from Satisfaction to Leadership, a causal link from Leadership to Performance, and reciprocal correlation between Performance and Satisfaction and between Performance and Internal Work Environment. This model was not identified.

In conclusion, none of the models examined in support of the Satisfaction - Leadership causal link (Hypothesis 7) provided an adequate fit to the data. It was thus decided not to pursue further analysis based on the attribution approach.

The next series of models was tested in order to examine the influence, if any, of certain Other Causal variables. Two such variables, School SES and Environmental Turbulence, were determined to be the most influential alternative independent variables for this set of data.[48]

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[48] See the discussion on "Other Causal Variables" earlier in this chapter.

The reader is referred to Table 6.2 for detailed descriptions of these variables, and to Table 6.3 for correlations with other subindices used in the model specification of Subproblem Three.

Figure 6.3 presents the specification of the modified model tested at this stage. It differs from Figure 6.2, based on the results obtained from the tests performed on the preceding 23 models. A causal link has been added between Leadership and Satisfaction. In addition, the path from Internal Work Environment - Satisfaction has been deleted. The other causal variables, School SES and Environmental Turbulence, have also been included and are presumed to be related to one another in some unknown way. Both of these latter variables are also believed to impact Satisfaction and Performance. The exploratory hypotheses to be tested were:

(8) Environmental Turbulence directly impacts Satisfaction

(9) Environmental Turbulence directly impacts Performance

(10) School SES directly impacts Satisfaction

(11) School SES directly impacts Performance.

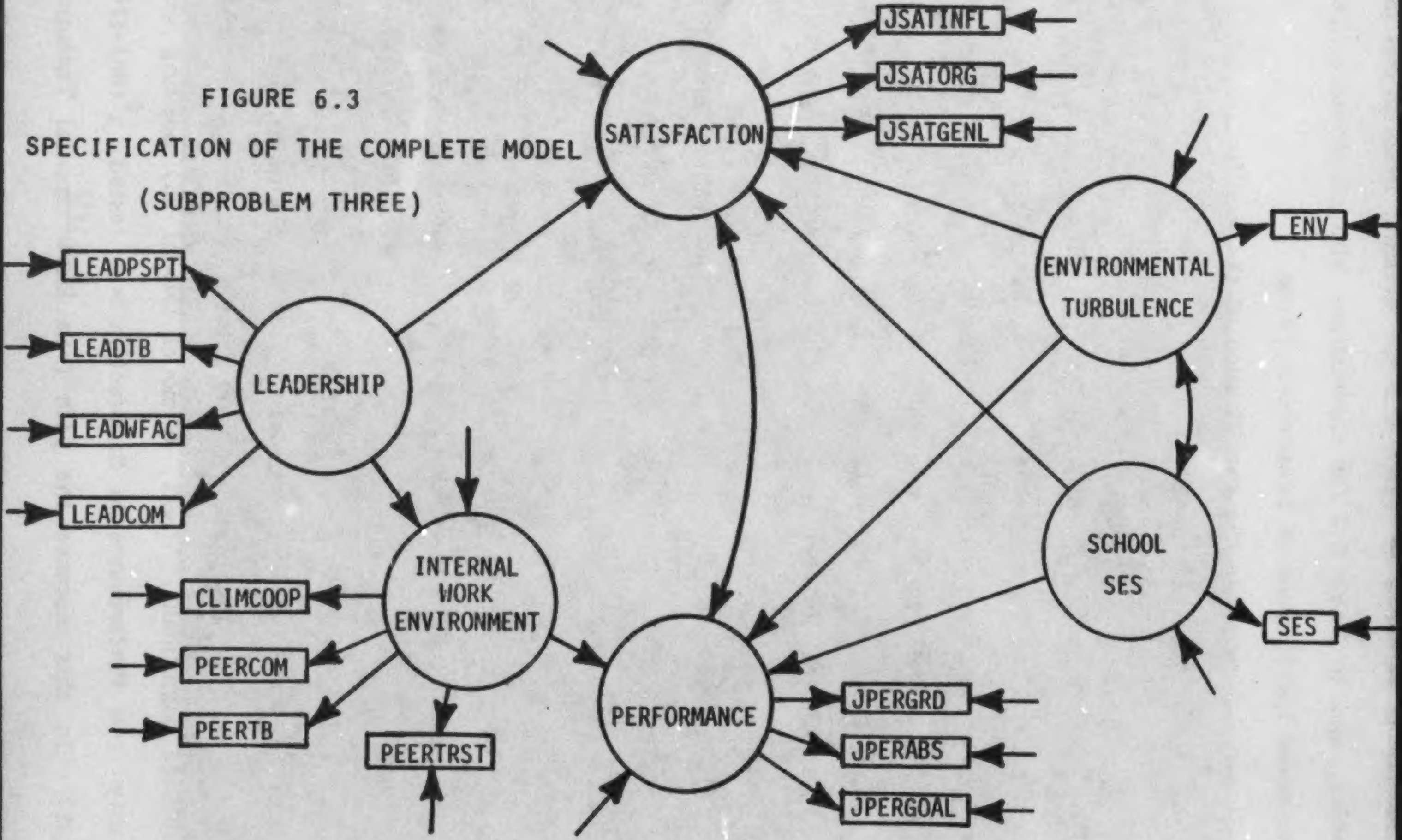
(12) The relationship between Environmental Turbulence and School SES is not known, but the two are correlated in some manner.

The initial model tested in this series (Model 24) was identical to the model depicted in Figure 6.3. This model fit poorly: $\chi^2(88)=115.6910$, p=.0256, with none of the paths from SES or Environmental Turbulence significant. Next, a model (Model 25) positing one way causality from Performance to Satisfaction was tested, $\chi^2(88)=116.6940$, p=.0220. In this instance the path from Environmental Turbulence to

FIGURE 6.3

SPECIFICATION OF THE COMPLETE MODEL

(SUBPROBLEM THREE)



SATISFACTION
JSATINFL
JSATORG
JSATGENL
ENVIRONMENTAL TURBULENCE
ENV
LEADPSPT
LEADTB
LEADWFAC
LEADCOM
LEADERSHIP
INTERNAL WORK ENVIRONMENT
CLIMCOOP
PEERCOM
PEERTB
PEERTRST
PERFORMANCE
JPERGRD
JPERABS
JPERGOAL
SCHOOL SES
SES

Performance was significant, but the links between Leadership - Satisfaction and Performance - Satisfaction were not.

Next, a model (Model 26) was tested in which the links from SES to Performance and Environmental Turbulence - Performance were deleted, and the SES - Satisfaction path was simply correlated. This model fit poorly: $\chi^2(90)=119.8347$, $p=.0195$. All paths, except the correlation between SES and Environmental Turbulence, were significant, however. Next, a model (Model 27) was tested in which the Environmental Turbulence - Satisfaction path was deleted and a path added from Environmental Turbulence to Internal Work Environment. The two-way causal link between Performance and Satisfaction was also restored. This, too, fit poorly: $\chi^2(90)=123.9509$, $p=.0103$. The Environmental Turbulence - Internal Work Environment path was not significant.

Following this, another model (Model 28) was tested in which one way links from Environmental Turbulence to Performance, and from SES to Performance were restored, the Environmental Turbulence - Internal Work Environment path was deleted, the Performance - Satisfaction paths were correlated. The fit was poor: $\chi^2(89)=124.1436$, $p=.0082$, with various paths not significant.

By this time it had become apparent that the Environmental Turbulence variable was adding little to the causal power of the models. None of the models which included the variable fit well, and few of the paths between this variable and any other variables were significant. Consequently, Hypotheses 8, 9, and 12 were rejected and the variable was deleted from future model specification.

The final series of models was designed to test the relationships between SES - Performance and SES - Satisfaction. Model 29 was similar to Figure 6.3, except for the absence of Environmental Turbulence and the causal paths associated with it. This model fit fairly well: $\chi^2(76)=86.4370$, $p=.1938$, but the two paths from SES to Performance and SES to Satisfaction were not significant. Model 30 was similar to Model 29, differing only in the one-way linkage between Performance and Satisfaction: $\chi^2(76)=86.7866$, $p=.1867$. Again the paths from SES to Performance and SES to Satisfaction were nonsignificant, as were the paths from Leadership to Satisfaction and Performance to Satisfaction.

Neither acceptance nor rejection of Hypotheses 10 and 11 was clearly indicated. From the tests reported above it appeared that SES impacted both Satisfaction (Hypothesis 10) and Performance (Hypothesis 11), although not significantly in either case.[49] On the other hand, the fit of the models which included SES was not as good as in those models where SES was not specified. Accordingly, it was decided that the more parsimonious models (Models 17 and 18) provided a slightly better fit to the data and these models will be discussed in greater detail shortly. Before moving to this discussion, however, a brief summary of the exploratory hypotheses tested in this chapter may be in order.

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[49] It is possible that SES could have been impacting the Internal Work Environment construct, rather than either of the end-result variables. This would be consistent with the Browne and House (1967) supposition that climate is sensitive to "cultural and economic impairment." Evidence remains equivocal, however, as to the correctness of this supposition. Farber (1968), Rogers (1969), and Sommerville (1969) all report significant relationships between low SES and closed school climate, while Guy (1969), Say (1971), and Slater (1976) found no support for this relationship.

Summary of Hypothesis Testing

Models 1-30 were tested in order to explore a number of hypotheses concerning the nature of the causal structure connecting the variables of interest. A summary of findings relative to these hypotheses follows:

(1) Leadership has a direct effect on Internal Work Environment (not rejected).

(2) The relationship between Performance and Satisfaction is not known, but the two are correlated in some manner (not rejected).

(3) Leadership has a direct effect on Satisfaction (not rejected).

(4) The effects of Leadership on Satisfaction are mediated by the Internal Work Environment (rejected).

(5) Leadership has a direct effect on Performance (rejected).

(6) The effects of Leadership on Performance are mediated by the Internal Work Environment (not rejected).

(7) Perceived Satisfaction causes certain behavioral characteristics to be attributed to the Leadership of the organization--the attribution hypothesis (rejected).

(8) Environmental Turbulence directly impacts Satisfaction (rejected).

(9) Environmental Turbulence directly impacts Performance (rejected).

(10) School SES directly impacts Satisfaction (rejected).

(11) School SES directly impacts Performance (rejected).

(12) The relationship between Environmental Turbulence and School SES is not known, but the two are correlated in some manner (rejected).

As a result of this process, two models emerged as plausable explanations for the data obtained from the Study of Schooling. These models will be discussed in the following section.

Specification of Final Model(s)

The two models which appeared to best fit the data are presented as Figures 6.4 and 6.5. Immediately following each structural model is a table specifying the corresponding measurement model (Tables 6.4 and 6.5). These models are very similar, differing primarily in the causal link connecting Performance and Satisfaction. Model I (formerly Model 17) depicts reciprocal causation (correlation) between these variables, while Model II (formerly Model 18) posits a one-way link from Performance to Satisfaction. Naturally, estimates and standard errors also vary between these models.

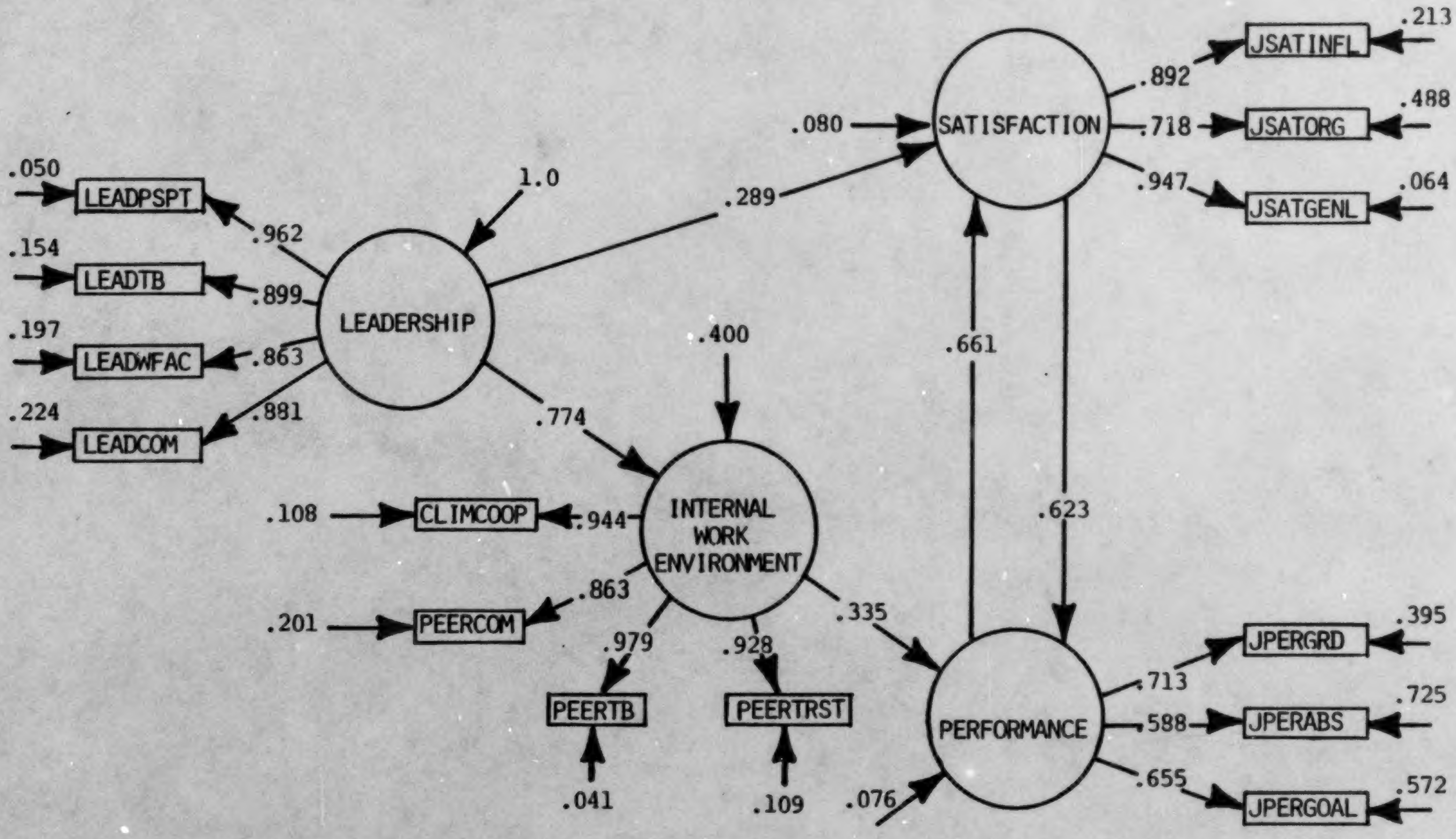
Results of goodness of fit testing for the two models shows that both are nearly identical in their fit to the data (although Model I does fit slightly better):

- Model I (formerly Model 17): $\chi^2(64)=66.5909$, $p=0.3879$
- Model II (formerly Model 18): $\chi^2(64)=67.6645$, $p=0.3532$

Examination of the data presented in Table 6.4 and 6.5 reveals, further, that both the measurement structures and the causal structures are relatively invariant across both of the models. For Model I the latent constructs are defined as follows:

FIGURE 6.4

MODEL I



LEADERSHIP
SATISFACTION
INTERNAL WORK ENVIRONMENT
PERFORMANCE
.050
LEADPSPT
.962
.154
LEADTB
.899
.197
LEADWFAC
.863
.224
LEADCOM
.881
1.0
.289
.080
.774
.400
.108
CLIMCOOP
.944
.201
PEERCOM
.863
PEERTB
.979
.041
PEERTRST
.928
.109
.335
.661
.623
.076
JSATINFL
.892
.213
JSATORG
.718
.488
JSATGENL
.947
.064
JPERGRD
.713
.395
JPERABS
.588
.725
JPERGOAL
.655
.572

TABLE 6.4

MEASUREMENT MODEL FOR MODEL I (FIGURE 6.4)

Parameter	Unstandardized Estimate	Unstandardized Standard Error[a]	Standardized Estimate	Standardized Standard Error[a]	Critical Ratio[b]
Loading for:					
LEADPSPT on Leadership	.962	.146	.962	.146	6.59
LEADTB on Leadership	.899	.152	.899	.152	5.91
LEADWFAC on Leadership	.863	.152	.863	.152	5.68
LEADCOM on Leadership	.881	.160	.881	.160	5.51
CLIMCOOP on Int. Work Env.	.597	.100	.944	.158	5.97
PEERCOM on Int. Work Env.	.546	.097	.863	.153	5.64
PEERTB on Int. Work Env.	.619	.098	.979	.155	6.32
PEERTRST on Int. Work Env.	.587	.099	.928	.157	5.91
JPERGRD on Performance	.196	.130	.713	.473	1.51
JPERABS on Performance	.162	.112	.588	.407	1.44
JPERGOAL on Performance	.180	.121	.655	.440	1.49
JSATINFL on Satisfaction	.253	.182	.892	.642	1.39
JSATORG on Satisfaction	.203	.134	.718	.474	1.51
JSATGENL on Satisfaction	.268	.191	.947	.675	1.40
Factor Variance of:					
Leadership	1.000^{c}		1.000^{c}		
Regression Residuals for:					
Internal Work Environment	1.000^{e}		.400		
Performance	1.000^{e}		.078		
Satisfaction	1.000^{e}		.080		
Residual Variance for:					
LEADPSPT	.050	.034			1.47
LEADTB	.154	.052			2.96
LEADWFAC	.197	.061			3.23
LEADCOM	.224	.069			3.25
CLIMCOOP	.108	.038			2.84
PEERCOM	.201	.063			3.19
PEERTB	.041	.023			1.78
PEERTRST	.109	.038			2.87
JPERGRD	.395	.127			3.11
JPERABS	.725	.179			4.05
JPERGOAL	.572	.143			4.00
JSATINFL	.213	.127			1.68
JSATORG	.488	.129			3.78
JSATGENL	.064	.080			0.80

TABLE 6.4 (Continued)

Parameter	Unstandardized Estimate	Unstandardized Standard Error[a]	Standardized Estimate	Standardized Standard Error[a]	Critical Ratio[b]
Residual Covariance of:					
LEADPSPT & JPERGRD	.072	.042			1.71
LEADPSPT & JSATGENL	.079	.035			2.26
LEADTB & PEERTRST	-.044	.031			-1.42
LEADTB & JSATGENL	.098	.038			2.58
LEADWFAC & JPERGRD	.161	.057			2.82
LEADWFAC & JSATGENL	.181	.051			3.55
PEERCOM & JPERABS	.221	.084			2.63
JPERGRD & JSATINFL	-.241	.090			-2.68
JSATGENL & JSATINFL	-.239	.068			-3.53
Causal Effects of:					
Leadership on Internal Work Environment	1.224	.336	.774	.212	3.65
Leadership on Satisfaction	1.020	.390	.289	.111	2.60
Internal Work Environment on Performance	.771	.260	.335	.113	2.96
Performance on Satisfaction[d]	.642	.244	.661	.251	2.63
Satisfaction on Performance[d]	.642	.244	.623	.237	2.63

Test of Goodness of Fit: χ^2 (64) = 66.5909, p = 0.3879

[a] Standard Errors are simultaneous maximum likelihood estimates.

[b] Critical Ratio (C.R.) is the ratio of the parameter estimate to its standard error. Where standardized estimates are available, the critical ratio is the ratio of the standardized estimate to its standardized standard error. A C.R. > 2.00 is taken as a criterion for a parameter estimate that is significantly different from zero. For a two-tail test, p = .045, for a one-tail, p = .023.

[c] Denotes parameters that were fixed at the indicated values.

[d] Note that estimates of the path from Performance to Satisfaction and of the path from Satisfaction to Performance were constrained to equality. This equality of reciprocal causal paths may be interpreted as a correlation between the two variables.

[e] These regression residuals were fixed at the indicated values but do not imply a percentage of residual variation. Rather, they merely provide a set of constants which are necessary for unique estimation of other parameters in the model (i.e., identification constraints).

FIGURE 6.5

MODEL II

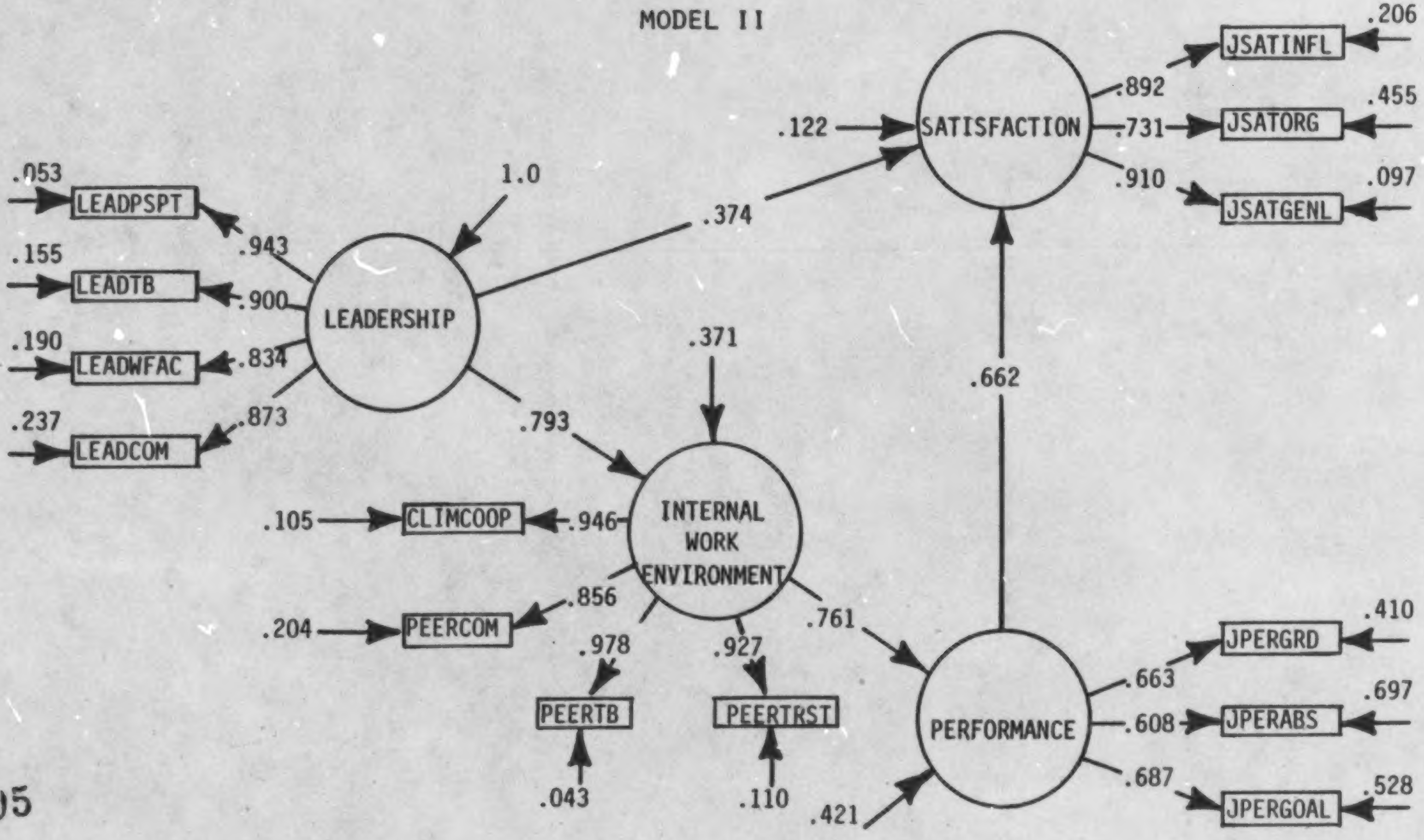

.053
LEADPSPT
.943
.155
LEADTB
.900
.190
LEADWFAC
.834
.237
LEADCOM
.873
1.0
LEADERSHIP
.374
.793
.122
SATISFACTION
.892
.731
.910
.206
JSATINFL
.455
JSATORG
.097
JSATGENL
.371
.105
CLIMCOOP
.946
INTERNAL
WORK
ENVIRONMENT
.856
.204
PEERCOM
.978
PEERTB
.043
.927
PEERTRST
.110
.761
.662
PERFORMANCE
.421
.663
.608
.687
.410
JPERGRD
.697
JPERABS
.528
JPERGOAL

TABLE 6.5

MEASUREMENT MODEL FOR MODEL II (FIGURE 6.5)

Parameter	Unstandardized Estimate	Unstandardized Standard Error[a]	Standardized Estimate	Standardized Standard Error[a]	Critical Ratio[b]
Loading for:					
LEADPSPT on Leadership	.943	.144	.943	.144	6.55
LEADTB on Leadership	.900	.152	.900	.152	5.92
LEADWFAC on Leadership	.834	.146	.834	.146	5.71
LEADCOM on Leadership	.873	.161	.873	.161	5.42
CLIMCOOP on Int. Work Env.	.576	.095	.946	.156	6.06
PEERCOM on Int. Work Env.	.521	.092	.856	.151	5.67
PEERTB on Int. Work Env.	.596	.093	.978	.153	6.39
PEERTRST on Int. Work Env.	.565	.095	.927	.156	5.94
JPERGRD on Performance	.430	.111	.663	.171	3.88
JPERABS on Performance	.395	.103	.608	.159	3.82
JPERGOAL on Performance	.446	.106	.687	.163	4.21
JSATINFL on Satisfaction	.312	.133	.892	.380	2.35
JSATORG on Satisfaction	.256	.091	.731	.260	2.81
JSATGENL on Satisfaction	.318	.134	.910	.383	2.38
Factor Variance of:					
Leadership	1.000[c]		1.000[c]		
Regression Residuals for:					
Internal Work Environment	1.000[e]		.371		
Performance	1.000[e]		.421		
Satisfaction	1.000[e]		.122		
Residual Variance for:					
LEADPSPT	.053	.034			1.56
LEADTB	.155	.052			2.98
LEADWFAC	.190	.059			3.22
LEADCOM	.237	.070			3.39
CLIMCOOP	.105	.037			2.84
PEERCOM	.204	.064			3.19
PEERTB	.043	.024			1.79
PEERTRST	.110	.038			2.89
JPERGRD	.410	.142			2.89
JPERABS	.697	.178			3.92
JPERGOAL	.528	.140			3.77
JSATINFL	.206	.124			1.66
JSATORG	.455	.135			3.37
JSATGENL	.097	.084			1.15

TABLE 6.5 (Continued)

Parameter	Unstandardized Estimate	Unstandardized Standard Error[a]	Standardized Estimate	Standardized Standard Error[a]	Critical Ratio[b]
Residual Covariance of:					
LEADPSPT & JPERGRD	.086	.046			1.87
LEADPSPT & JSATGENL	.086	.036			2.39
LEADTB & PEERTRST	-.044	.031			-1.42
LEADTB & JSATGENL	.110	.040			2.75
LEADWFAC & JPERGRD	.162	.059			2.75
LEADWFAC & JSATGENL	.181	.051			3.55
PEERCOM & JPERABS	.224	.084			2.67
JPERGRD & JSATINFL	-.182	.086			-2.12
JSATGENL & JSATINFL	-.222	.070			-3.17
Causal Effects of:					
Leadership on Internal Work Environment	1.302	.345	.793	.210	3.78
Leadership on Satisfaction	1.070	.521	.374	.182	2.05
Internal Work Environment on Performance	.714	.179	.761	.191	3.98
Performance on Satisfaction	1.229	.636	.662	.343	1.93[d]

Test of Goodness of Fit: χ^2 (64) = 67.6645, p = 0.3532

[a] Standard Errors are simultaneous maximum likelihood estimates.

[b] Critical Ratio (C.R.) is the ratio of the parameter estimate to its standard error. Where standardized estimates are available, the critical ratio is the ratio of the standardized estimate to its standardized standard error. A C.R. > 2.00 is taken as a criterion for a parameter estimate that is significantly different from zero. For a two-tail test, p = .045, for a one-tail, p = .023.

[c] Denotes parameters that were fixed at the indicated values.

[d] p=.054 (two-tail), p=.027 (one-tail).

[e] These regression residuals were fixed at the indicated values but do not imply a percentage of residual variation. Rather, they merely provide a set of constants which are necessary for unique estimation of other parameters in the model (i.e., identification constraints).

- Leadership is defined by four manifest indicators, having the following factor loadings:
  - LEADPSPT (.962)
  - LEADTB (.899)
  - LEADCOM (.881)
  - LEADWFAC (.863)
- Internal Work Environment is defined by four manifest indicators:
  - PEERTB (.979)
  - CLIMCOOP (.944)
  - PEERTRST (.928)
  - PEERCOM (.863)
- Satisfaction is defined by three manifest indicators:
  - JSATGENL (.947)
  - JSATINFL (.892)
  - JSATORG (.718)
- Performance is defined by three manifest indicators:
  - JPERGRD (.713)
  - JPERGOAL (.655)
  - JPERABS (.588)

In Model II the latent constructs are defined by the same manifest indicators, but with slightly different factor loadings:

- Leadership is defined by four manifest indicators:
  - LEADPSPT (.943)
  - LEADTB (.900)
  - LEADCOM (.873)
  - LEADWFAC (.834)
- Internal Work Environment is defined by four manifest indicators:
  - PEERTB (.978)
  - CLIMCOOP (.946)
  - PEERTRST (.927)
  - PEERCOM (.856)
- Satisfaction is defined by three manifest indicators:
  - JSATGOAL (.910)
  - JSATINFL (.892)
  - JSATORG (.731)
- Performance is defined by three manifest indicators:
  - JPERGOAL (.687)
  - JPERGRD (.663)
  - JPERABS (.608)

Even though the factor loadings differ slightly between the two models, the indicators for each latent construct except Performance maintain the same relative "order" among themselves. That is, in both sets of models LEADPSPT defines most of the factor; LEADTB accounts for slightly less; LEADCOM still less; LEADWFAC the least, etc. For the Performance construct, this order is altered slightly in that JPERGRD defines most of the factor for Model I while JPERGOAL does so for Model II.[50] In general, however, the magnitude of the factor loadings do not differ appreciably from one model to the other.

The causal structures are also quite similar across both models. Model I and II differ only on the path between Performance and Satisfaction. Model I posits that the two constructs are correlated, while Model II posits one-way causality from Performance to Satisfaction. All paths, except for the Performance - Satisfaction path of Model II (p = .054 [two-tail]; p = .027 [one-tail]) are within statistical significance limits. Causal effects for each of the models are as follows (standardized estimates, except as noted):

- For Model I:
  - Effect of Leadership on Internal Work Environment = .774
  - Effect of Leadership on Satisfaction = .289
  - Effect of Internal Work Environment on Performance = .335
  - Correlation between Performance and Satisfaction (unstandardized estimate) = .642

---

[50] Note that Performance is probably the least well defined construct. Not only does the order of the factor loadings shift slightly, but the magnitude of the loadings is somewhat lower than for any other latent construct.

- For Model II:
  Effect of Leadership on Internal Work Environment = .793
  Effect of Leadership on Satisfaction = .374
  Effect of Internal Work Environment on Performance = .761
  Effect of Performance on Satisfaction = .662

In substantive terms, both models postulated leadership as the exogenous (causal) variable, influencing the internal working environment and the group processes occurring within the school staff.

Principal leadership also directly affects the satisfaction level of the faculty. Model I shows that the performance of the school is a result of the staff satisfaction level and of leader behaviors, as mediated by the prevailing work environment. The school's performance, in turn, has some effect on the level of teacher satisfaction. Model II portrays performance as a result of mediated leader behaviors alone. Satisfaction, in turn, is affected by job performance.

As the final step in the data analysis process it was necessary to specify and test the basic models without correlated error. Results of the procedure were as follows:

- Model I: $\chi^2(73)=125.7701$, $p=<.0001$
- Model II: $\chi^2(73)=125.6714$, $p=<.0001$

Successive addition of each of the nine previously unrelated errors failed to produce a model demonstrating a superior fit to either model I or II, as specified in Tables 6.4 and 6.5.

Selection of either of these models as the one best fitting the data proved difficult. Results of goodness of fit testing were equivocal (Model I, p = .3879; Model II, p = .3532), although Model I did appear to be a slightly better fit. Examination of the significance levels of the causal paths, too, showed that the Performance to Satisfaction link of Model II was just slightly nonsignificant ($p = .054$, $p = .027$), while all paths in Model I were significant. The results would seem to indicate that Model I did provide the best fit to the data. This conclusion is consistent with a number of substantive theories in the organization behavior domain. Consequently, this decision will be accepted, while bearing in mind the important limitations already noted; especially the limitations engendered by the problems encountered in operationalization of the theory with available SOS data.

OTHER FINDINGS

An unexpected outcome was found during the model testing undertaken in examination of Exploratory Hypothesis 1: "Leadership has a direct effect on Internal Work Environment." This occurred when the nature of the causal path between Leadership and Internal Work Environment was being investigated. The series of models originally tested all proposed that Leadership causally preceded Internal Work Environment. This a priori assumption was based on the conceptualization of Internal Work Environment as closely resembling Taylor and Bowers' (1972) Group Process construct, an intervening variable. If this assumption held true, then Leadership was the causal variable of interest in the tested models.

Due to the problems encountered earlier in the operationalization of the climate construct, however, it was not completely clear that the assumption was correct. Perhaps the Internal Work Environment construct more closely resembled Likert's Climate variable, in which case

Internal Work Environment, not Leadership, was the causal variable of interest.

Consequently, because the Internal Work Environment/Climate variable had been problematic, and for the sake of completeness, it was decided to test several models in which Internal Work Environment causally preceded Leadership. All of these models[51] were identical to models tested earlier, with the exception of the reversed causal path.

The first model (Model A) was similar to Model 1. Model A posited the path from Internal Work Environment to Leadership; a path from Internal Work Environment to Performance; one from Internal Work Environment to Satisfaction, and a correlation between Performance and Satisfaction. Like Model 1, Model A did not converge.

Next, a series of models was proposed and tested, similar to Models 7-11, as tested earlier. All five of these models were alike, varying only on the nature of the path between Performance and Satisfaction. They all posited paths from Internal Work Environment to Leadership; from Leadership to Performance; from Leadership to Satisfaction, and from Internal Work Environment to Performance. Model B, like Model 7, specified reciprocal causation between Performance and Satisfaction. Like Model 7, Model B was not identified.

Model C, similar to Model 8, posited that Performance and Satisfaction were correlated. Like Model 8, Model C fit well (χ^2 (63) = 66.2561, p = .3653), and the results of the goodness of fit testing were identical for the two models. Model D, similar to Model 9, specified that Performance had a direct causal effect on Satisfaction. Like Model 9, Model D fit well (χ^2 (63) = 66.9448, p = .3433), again with identical χ^2 results. Model E, like Model 10, specified Satisfaction as having a direct effect on Performance. Like Model 10, Model E did not converge. Model F, similar to Model 11, proposed no causal link between Performance and Satisfaction. Model F, like Model 11, produced an improper solution.

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[51] See Appendix D. These models were given letter names to distinguish them from the models previously discussed.

Following this series, two other models were tested, similar to the two models selected as those best fitting the data, Model I (formerly Model 17) and Model II (formerly Model 18). Model G was identical to Model I (see Figure 6.4), except for the reversed causal path from Internal Work Environment to Leadership. Results of goodness of fit testing for Model G were identical with those found for Model I (χ^2 (64) = 66.5909, p = .3879). The same held true for Model H, which was similar to Model II (Figure 6.5). χ^2 results were: χ^2 (61) = 67.6645, p = .3532.

In fact, further inspection of the results of model testing for Models G and H showed them to be absolutely identical to Models I and II in every way, except for the reversal of the Internal Work Environment-Leadership path. The goodness of fit tests, the degrees of freedom, and all parameter estimates are identical (see Appendix F for complete measurement and causal structures of Models G and H).

This strongly suggests that Model G may be a linear transformation of Model I, or vice versa (Wingard, 1980). The same holds for Model H and Model II. Given these facts it becomes impossible to interpret the apparent difference (the differing direction of causality between Leadership and Internal Work Environment) solely on methodological grounds. Practically, this makes it hard to argue for any theoretical differences between the Leadership - causes - Internal Work Environment and the Internal Work Environment - causes Leadership hypotheses.

For purposes of the present study, however, Hypothesis 1 was not rejected. This was due to the fact that: (1) Model testing results suggested the necessity of some type of causal path between Leadership and Internal Work Environment; although as has just been noted, the directionality of the path is not statistically deducible. (2) It was concluded that the Internal Work Environment index was measuring essentially the same concepts as Taylor and Bowers' Group Process variable. This conclusion was reached after reexamination of the index and comparison with Taylor and Bowers' (1972) and Franklin's (1973) specifications of the Group Process construct. (3) Given (1) and (2), it made more conceptual sense to view the Internal Work Environment of the school as a result of the Leadership style and behaviors of the principal. This is not to say that the type and level of group processes occurring among school staff might not have some impact upon the principal. What is suggested is that the leader probably does a great deal toward setting the internal "tone" of the organization and that this "tone" or climate somehow impacts the level of staff satisfaction as well as how well the school performs its mission.

SUMMARY OF FINDINGS

Subproblem Three was concerned with specification and testing of various alternative models incorporating selected variables drawn from the model listed in Subproblem Two. The general research hypothesis was that one or more alternative models would better represent the causal relationships among the variables than the original (modified Likert) model. This hypothesis was supported. Several alternative models provided better fit to the data, and two of these were examined in some detail.

The process of alternative model specification and testing began with a review of the data from Subproblem Two. The structural model was then respecified, with the following results: (A) The Climate and Peer Work Environment indices were collapsed into a new index, Internal Work Environment. This index closely resembled the Group Process index investigated by Franklin (1973, 1975a, b). (B) The Trust index was merged into the Principal Leadership index, giving a new index, Leadership. (C) The indicator variables for each index were respecified. (D) Two additional causal variables, School SES and Environmental Turbulence, were defined. An alternative model was then proposed (Figure 6.2), consisting of four latent constructs (Leadership, Internal Work Environment, Satisfaction, and Performance) measured by 14 manifest indicators.

Six primary exploratory hypotheses were then proposed and tested:

(1) Leadership has a direct effect on Internal Work Environment (not rejected).
(2) The relationship between Performance and Satisfaction is not known, but the two are correlated in some manner (not rejected).
(3) Leadership has a direct effect on Satisfaction (not rejected).
(4) The effects of Leadership on Satisfaction are mediated by the Internal Work Environment (rejected).
(5) Leadership has a direct effect on Performance (rejected).

> (6) The effects of Leadership on Performance are mediated by the Internal Work Environment (not rejected).

Twenty structural equation models were tested in the investigation of these six hypotheses. Results of the testing indicated that the principal's leadership behavior has a direct impact on the nature of the group processes occurring within the school; that teacher job satisfaction and school performance were correlated in some manner; that principal leadership had a direct effect on level of staff satisfaction; that principal leadership impacted the performance of the school, but that leadership style was mediated by the working environment created by the teachers themselves. Support was not found for either direct effects of leadership on performance nor for mediated effects of leadership on staff satisfaction through the working environment.

Another set of models (eight in all) was tested in order to more fully investigate the nature of the Leadership - Internal Work Environment path. One unexpected outcome of this analysis was the finding that the directionality of this path could not be determined solely by reliance on statistical testing procedures. Final determination of causal directionality was made primarily on substantive grounds.

An additional set of exploratory hypotheses was then tested:

> (7) Perceived Satisfaction causes certain behavioral characteristics to be attributed to the Leadership of the organization--the attribution hypothesis (rejected).

Three models were tested, with results indicating no support for this hypothesis.

A final set of exploratory hypotheses was developed to examine the impact, if any, of School SES and Environmental Turbulence upon the basic model depicted in Figure 6.2:

(8) Environmental Turbulence directly impacts Satisfaction (rejected).
(9) Environmental Turbulence directly impacts Performance (rejected).
(10) School SES directly impacts Satisfaction (rejected).
(11) School SES directly impacts Performance (rejected).
(12) The relationship between Environmental Turbulence and School SES is not known, but the two are correlated in some manner (rejected).

Seven models were then tested. Results indicated that the level of turbulence in the immediate political environment of the school did not significantly impact either the level of staff satisfaction nor the school's performance. Results concerning SES were not well defined. School SES did appear to affect both performance and staff satisfaction. However, models containing the SES variable did not fit the data as well as did those without it. For this reason, and in the interests of parsimony, the set of four-variable models (Models I and II) was believed to best represent the data.

Two models (Figure 6.4, 6.5) were ultimately selected as best representing the data. Both of these models specify principal leadership as the chief causal variable affecting staff satisfaction and the internal work environment of the school. School performance is believed to be either solely a result of leader behavior, mediated by working environment (Model II), or a result of mediated leader behavior and the level of teacher satisfaction (Model I). Teacher satisfaction is seen as a result of both leader behavior and perceived job performance.

Discrimination between these two models proved difficult. Results of the statistical testing procedures were not entirely conclusive. Model I was tentatively selected as the best fitting model, however, but in full realization of the limits imposed by the nature of the data themselves.

LIMITATIONS

Limitations on the results obtained during the analysis of Subproblem Three are based on both methodological and substantive considerations. Methodological limitations include:

(1) The current study was conceived as an exploratory model building attempt, not an effort at theory testing. The focus of the study was on data exploration and model building, rather than on model evaluation and testing of theory. Statistical decision rules used for discrimination among models were geared toward identification of those models which provided the best fit to the data. Rigorous hypothesis-testing procedures could not be followed, since the data were continually being probed, scrutinized, and re-ordered. The resulting models must be viewed in light of their exploratory, uncomfirmed genesis.[52]

(2) A single latent construct may underlie all four variables eventually incorporated into final model specification. Given the results of the factor analysis (Appendix C), it may be that one or more unknown factors actually underlie all of the variables composing the models tested in this subproblem. No test of single factoredness was performed. Consequently, discriminant validity is not clearly indicated.

(3) Several of the variables used in final model specification are clearly not normally distributed (especially Environmental Turbulence and School SES). This could have deleterious effects on maximum likelihood

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[52] Bentler, 1978, suggests using a new sample to cross-validate the analytic and parameter estimation procedures. This proved impossible, due to the relatively small sample size and to the secondary nature of the existing data.

estimates of the parameters. As has been noted in the earlier discussion of structural equation modeling, there have been to date, no Monte-Carlo studies performed to evaluate the effect of violation of assumptions of multivariate normality upon maximum likelihood estimates.[53]

(4) No individual factors related to job satisfaction were included in the measurement models of this study. The variance of criteria such as job satisfaction have been accounted for by both organizational variables (absenteeism, tenure, level in the organization) and by personal characteristics (age, sex, education). The substantive literature remains unclear as to whether these two classes of variables provide better predictive power separately or in conjunction with one another. Bass (1967), Friedlander and Margulies (1969), Sells (1963), and Steers (1975) argue that both individual and organizational indicators must be considered. This view has been disputed by Ford and Bagot (1978), Herman, Dunham, and Hulin (1975), and Herman and Hulin (1972), among others. Herman and Hulin argue that organizational variables regularly account for two to four times the amount of variance as accounted for by personal characteristics. The current study included only organizational variables. If individual variables had also been included, the models may have had different specifications.

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[53] Bentler, 1980.

INTERPRETATION

In order to make conceptual sense out of the best fitting model (Model I, Figure 6.4), it is necessary to first understand the measurement aspects of the model. In this section, therefore, an attempt will be made to discuss: (A) what the model is (the structure of the manifest variables), (B) what the model says (the content of the latent variables), and (C) what other researchers have said about similarly constructed variables. The structural aspects of the model (how the latent variables are related) will be dealt with in Chapter VII.

The measurement structure of a causal model describes how the manifest or indicator variable measures the latent variables or hypothetical constructs. Model I postulated four hypothetical constructs: Leadership, Internal Work Environment, Satisfaction and Performance. These latent variables were measured by a total of 14 indicator variables. Each of these latent constructs and their indicators will now be discussed in light of other empirical and theoretical work on the effectiveness construct.

Leadership

The four manifest variables defining Leadership are as follows:

Support by Principal (LEADPSPT): Measures extent to which principal is seen as friendly and supportive (factor loading = .962; C.R. = 6.59).

Principal Team Building (LEADTB): Measures extent to which principal uses group methods in problem solving (factor loading = .899; C.R. = 5.91).

Principal Work Facilitation (LEADWFAC): Measures extent to which principal secures needed resources, facilitates the planning process, and acts as an expert resource on school related matters (factor loading = .863; C.R. = 5.68).

Principal Communication (LEADCOM): Measures extent to which teachers believe upward communication is adequate (factor loading = .881; C.R. = 5.51).

Examination of the critical ratios for each of these indicators reveals that all contribute significantly to the definition of the latent construct.[54] In addition, all of the indicators are of the same order of magnitude, with the Support factor contributing most strongly to the construct definition.

The latent construct that has been defined by these indicators is one in which the key leader behaviors are: (A) the amount of support shown toward the teaching staff; (B) the degree to which the principal encourages the staff to work as a team, rather than as a collectivity of more or less isolated individuals; (C) the degree to which the principal helps teachers to better perform the technical side of their jobs; (D) the degree to which the principal ensures that all types of information flow freely from the teaching staff to the school administrator. While not explicitly addressed, this definition implies a participatory style of leadership. It describes a leader who is supportive of the efforts of the teaching staff to function as a team, and as one who knows and is sympathetic to the many problems faced by teachers in today's school environment. The climate created by such a leadership style would appear to be one in which decision-making by consensus or consultation would flourish, if such processes did not already exist.

Leadership is viewed as a series of behaviors, not as a collection of ideal personal traits. In this sense, the emergent "theory" of leadership reflected in the model resembles several other theoretical schemes. These include Likert's (1961, 1967, 1976) system 1-4 continuum, Bowers and Seashore's (1966) four-factor theory, Mann's (1965) skill mix, and the Ohio State leader behavior typology (Halpin & Winer, 1957; Hemphill & Coons, 1957). Although in-depth analysis of these theories is beyond the scope of the present study, a summary of the relevant variables of the theories is presented in Table 6.6. It should be noted that the four indicator variables of the present study most closely resemble the Likert, and the Bowers and Seashore conceptualizations. This is to be expected, given the genesis of the theoretical operationalization of the present study.

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[54] A critical ratio of 2.00 or greater has been used as the criterion for a parameter estimate that is significantly different from zero.

TABLE 6.6

COMPARISON OF VARIOUS LEADERSHIP THEORIES

Present Study	Likert (1961, 1976)	Bowers & Seashore (1966)	Mann (1965)	Halpin & Winer (1957)
Support by Principal	Supportive Relations	Support	Human Relations Skills	Consideration
Principal Team Building	Group Methods of Supervision	Interaction Facilitation		Consideration
Principal Work Facilitation	Technical Knowledge, Coordinating, Scheduling, Planning	Work Facilitation	Technical Skills	Initiation of Structure
Principal Communication	Efficient and Effective Communication		Administrative Skills	Initiation of Structure

Internal Work Environment

The four manifest variables which define the Internal Work Environment construct are as follows:

Team Cooperation: School (CLIMCOOP): Measures extent of internal teamwork (factor loading = .944; C.R. = 5.97).

Communication (PEERCOM): Measures adequacy of information flow within the school staff (factor loading = .863; C.R. = 5.64).

Peer Team Building (PEERTB): Measures extent to which teachers cooperate with and support each other (factor loading = .979; C.R. = 6.32).

Trust in Peers (PEERTRST): Measures extent to which teachers trust and have confidence in other teachers (factor loading = 9.28; C.R. = 5.91).

All critical ratios are significant and all indicators are of the same order of magnitude. Hence, all four of these variables appear to contribute significantly toward the definition of the construct.

The latent construct that has been defined by these indicator variables describes a working environment that is characterized by: (A) the amount of teamwork or coordinated effort occurring among the teaching staff; (B) the presence or absence of horizontal lines of communication and the adequacy of information sharing; (C) the level of support teachers have for one another; (D) the amount of interpersonal trust teachers feel toward their peers. A school scoring high on all of these dimensions would probably be one in which a highly cohesive teaching staff would be contributing toward the solution of various school related problems. If such an internal environment did exist, it would both enhance and encourage the use of participatory methods of decision making.

The Internal Work Environment construct, as defined by the present study, is obviously similar to the often-examined organizational climate construct. A major problem facing researchers in the climate domain has been that of construct definition. Most of the major reviewers of the construct (Campbell, et al., 1970; Hellriegel & Slocum, 1974; Howe & Gavin, 1974; James & Jones, 1974; Payne & Pugh, 1976) have recognized this problem, but as yet no universally acceptable definitions have been developed.

The present definition of Internal Work Environment resembles certain dimensions of a number of other investigators' theories, however. These include Taylor and Bowers' (1972) group process construct (as measured by the Survey of Organizations), four of Halpin and Croft's (1962) climate scales (as measured by the Organizational Climate Description Questionnaire), two of Litwin and Stringer's (1968) climate questionnaire scales, two of Campbell et al.'s (1970) consistently appearing climate dimensions, and two of House and Rizzo's (1972) theoretical scales (as measured by the Organizational Climate Questionnaire). A summary of these theories is presented in Table 6.7.

TABLE 6.7

COMPARISON OF VARIOUS ORGANIZATIONAL CLIMATE THEORIES

Present Study	Taylor & Bowers (1972)	Halpin & Croft (1962)	Litwin & Stringer (1968)	Campbell, et al. (1970)	House & Rizzo (1972)
Team Cooperation	Work Group Coordination	Disengagement		Supportiveness	
Communication	Information Sharing	Hindrance		Openness vs. Defensiveness	Horizontal Communication Information Distortion
Peer Team Building	Peer Interaction Facilitation (Not a group process variable)	Esprit	Support	Supportiveness	
Trust in Peers	Confidence and Trust	Intimacy	Warmth		

Performance

Three manifest variables define the Performance construct. These include:

School Rating (JPERGRD): A composite overall rating of the school. Schools were graded by parents and by students (factor loading = .713; C.R. = 1.51).

Student Absence (JPERABS): Average daily student absenteeism for preceding five year period (factor loading = .588; C.R. = 1.44).

Goal Consensus (JPERGOAL): A measure of agreement on general goals held for the school by parents, students, and teachers (factor loading = .655; C.R. = 1.49).

It is apparent that the Performance construct is not as well defined as either Leadership or Internal Work Environment. The critical ratios shown for the indicator variables do represent a significance level of approximately p = .14 (two-tail), p = .07 (one-tail), however. Since these three indicators were measured using data sources other than teachers, it could be expected that the factors be less tightly defined.

A high performing school, as defined by the present study, is one where the educational consumers, both parents and students, believe that the school is doing a good job in delivering quality education. This belief is reflected in low student absentee rates and in a high degree of agreement on actual goals for the school.

The latent construct that emerges is defined by one rating-type measure (School Rating), one attitudinal measure (Goal Consensus) and one archival measure (Student Absenteeism). Each of these measures is represented in the job performance literature. Kavcic, Rus, and Tannenbaum (1971), Mahoney and Weitzel (1969), and Student (1968) all used ratings by others, not self-ratings, as performance measures.

Several theorists suggest that agreement on organizational goals is a factor in effective organizational functioning (Argyris, 1964; Schein, 1970). There have been several studies attempting to investigate this assumption (Lawrence & Lorsch, 1967; Vroom, 1960), but no clear findings have emerged.

Student absenteeism was suggested by Likert as a possible measure of school performance (Rensis Likert Associates, 1978). In addition, absentee rates have been examined in other effectiveness-related contexts, especially in relation to structural variables such as size (Ingham, 1970; Talacchi, 1960). Absenteeism is not as thoroughly researched as turnover, but is, like turnover, believed to be inversely related to overall job satisfaction, participatory decision-making and job autonomy (Porter & Steers, 1973; Yolles, Carone, & Krinsky, 1975).

In summary, performance is usually defined through the use of archival records, ratings, or attitudinal-type measures. In the private sector performance and productivity are often equated. In schools, however, evaluation of performance becomes more difficult, especially without access to student achievement data.

Satisfaction

Three manifest variables define the Satisfaction construct. These indicators include:

> Satisfaction with Influence (JSATINFL): Measures extent of difference between the amount of influence teachers think they should have and the amount they believe they do have (factor loading = .892; C.R. = 1.39).
>
> Satisfaction with the Organization (JSATORG): Measures extent to which teachers look forward to their working day (factor loading = .718; C.R. = 1.51).
>
> General Satisfaction Level (JSATGENL): A composite rating of teacher satisfaction. Schools were graded by teachers (factor loading = .947; C.R. = 1.40).

The Satisfaction construct is about as well defined as Performance, with critical ratios again on the order of p = .14 (two-tail), p = .07 (one-tail). Of the three indicator variables included as satisfaction measures, one represents a facet satisfaction index (Satisfaction with Influence), while the other two are global satisfaction measures. Both of these measurement types have been reported in the literature (Bowers & Seashore, 1966; Guba, 1958; Smith, Kendall, & Hulin, 1969). As with the performance construct, satisfaction measures are usually developed for particular settings and research studies. This has resulted in a degree of conceptual pluralism--a fact which has hindered much of the satisfaction research (Carroll, 1973). Satisfaction is generally considered, however, to be an emotional response to some stimulus occurring in the individual's environment. Locke (1976, p. 1300) defines satisfaction as "...a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences." This definition will be accepted for purposes of the present study.

CHAPTER VII

SUMMARY, INTERPRETATION AND IMPLICATIONS

This chapter summarizes the results of the study, presents an interpretation of the models selected as best representing the data, and suggests possible implications of the research for both theory and practice in organizational behavior. The chapter will first restate the general problem area. This will then be followed by a review of the results generated during the investigation of each subproblem. Next, the results of the final model specification will be interpreted in light of recent research. This will be followed by a discussion of some possible theoretical implications and a discussion of implications for the practice of organizational change and development.

STATEMENT OF THE PROBLEM

The present study was designed to examine the domain of organizational effectiveness, and more specifically, the theory of effectiveness proposed by Rensis Likert and his colleagues at the University of Michigan. The focus of the study was on the causal structure of Likert's model, that is, upon how the variables of the model are causally related to one another. If the available data could be operationalized in such a way as to be able to test this model, it was hoped that both the directionality and magnitude of the causal relationships could be investigated. If the Likert model did not appear to fit the data, it was presumed that other, better fitting models could be developed and tested.

This study was conducted in response to a number of identified need areas, both substantive and methodological. Substantively, these included:

- A need for the development of methods for evaluating organizational change activities. The use of a model of effectiveness in which cause and effect relationships were postulated could both provide baseline data against which to measure change, and suggest possible intervention points for change activities.
- A need for improved understanding of the nature of the "effective" school organization. In this context, a number of questions come to mind: Just what is an effective school? What are the variables that distinguish an effective from a not so effective one? What causes one school to be more effective than another? How do these possible causes impact one another? It was hoped that answers to questions such as these could provide some guidance for policy and procedural decision making in schools.
- A desire to examine Likert's theory, using instruments other than those developed by Likert or his associates. This desire, while hardly a need, is still important, since Likert's theories have formed the basis for a large amount of empirical work in both the public and private sectors.

Methodological needs included:

- A need for more studies examining effectiveness using the organization as the unit of analysis. One way of accomplishing this is by employing multivariate techniques to the analysis of survey data.
- A need for more applications of causal modeling techniques to substantive domains where little work has, to date, been seen. This is especially true for the field of organization behavior.
- A need for exploratory model building (rather than model-testing) studies. Most of the literature reports tests conducted exclusively on single models. Such tests may provide

> support for one causal structure when, in fact, others may be equally or more plausible.

As a result of these identified needs, the present study was conceived as an exploratory model building investigation of the construct of organizational effectiveness. One theory, that of Likert and his associates, was operationalized. This was followed by the specification and testing of a number of causal models, using data from 25 secondary schools. As a result of this process, one model emerged which appeared to provide the best fit to the data. It is to be hoped that the interpretation of this final model may add something to the growing literature on the administration of school organizations.

REVIEW OF RESULTS

In order to explore the problem area just defined, three subproblems were identified and investigated.

Subproblem One

Subproblem Statement

The first subproblem was to operationalize Likert's model and to examine the internal consistency of the operationalization that was produced.

Research Hypothesis

The reseach hypothesis for Subproblem One was that Likert's model of effective organizations could be operationalized for testing using data derived from instruments other than Likert's own Profile of Schools or ISR's Survey of Organizations. If this hypothesis is accepted, then further subproblems and research hypotheses would be built upon the data set generated by the data treatment procedures of this subproblem.

Discussion

Likert's theory of effectiveness was selected for operationalization for several reasons: (1) It has already served as the theoretical base for a number of empirical studies in the education domain. (2) There have been several previous attempts to apply causal modeling techniques to Likert's theory, in both the public and private sectors. (3) The theory lent itself fairly well to the specification of relatively discrete, measurable variables. (4) IDEA's survey instruments were designed, in part, to collect data on some of Likert's concepts.

Causal variables selected for specification in the current study were Leadership (a measure of leader work-related behavior) and Climate (a measure of those facets of the work environment most heavily influenced by upper levels of the organizational hierarchy). Intervening variables included Trust (a measure of the amount of trust the school staff feels toward the principal) and Peer Work Environment (a measure of the peer leadership and group processes occurring within the school staff). End-Result variables were Job Satisfaction (an aggregated measure of staff satisfaction with various facets of the organization) and Job Performance (a measure of how well the school performs its mission).

Structural equation modeling was selected as the data analysis methodology for a number of reasons: (1) There have been relatively few studies attempting to utilize the methodology in the substantive fields of education or organizational behavior. (2) The nature of these substantive fields is such that they call for the conceptualization and measurement of unobserved constructs (i.e. leadership, satisfaction, climate, etc.). (3) The methodology allows the researcher to impute causality from cross-sectional, ex-post-facto data, such as those available from the SOS. (4) As part of the exploration of the data, it was desired that the methodology offer some means for selecting among models, in search of those that provide the best possible fit to the data. Structural equation modeling using the LISREL approach is an analytic technique which meets these needs.

The operationalization of the six variables of the Likert theory involved a continuous interplay between the realms of theory and of the data. As a result of this interplay, three modifications were made to the original model: (1) The Climate and Trust variables were defined more narrowly than a strict interpretation of the theory would suggest. (2) Leadership was defined as the primary causal variable. (3) A number of other potential causal variables were suggested by the literature and operationalized using the SOS data.

Survey items from the SOS instruments were selected to form the subindex and index structures in order to approximate the items used in two of Likert's instrument packages, the Profile of Schools and the Survey of Organizations. Item reliability was examined using the between-groups correlations and items were deleted as required to achieve a compromise between high intercorrelation and high construct validity. Throughout this procedure the primary concern was with tapping the constructs underlying the emergent model. It was important to secure some evidence of empirical support, but it was also realized that the data did not lend themselves to the formation of absolutely pure subindices.

A similar procedure was followed in examining the reliability of the resulting subindices. The outcome of this process was a set of six indices designed to measure the six variables of Likert's model of effectiveness in schools.

Thus, the research hypothesis for Subproblem One was accepted. The model did appear to lend itself to operationalization with data from the Study of Schooling. This allowed for the investigation of other subproblem areas and for the proposal of other research hypotheses.

Subproblem Two

Subproblem Statement

The second subproblem was to test the plausibility of the postulated relationships among the variables of Likert's model as operationalized by SOS data from Subproblem One.

Research Hypothesis

The research hypothesis for Subproblem Two was that the model of organizational effectiveness proposed by Likert did represent the causal relationships among the selected variables. Should this hypothesis be rejected after model testing, further models would be proposed and evaluated in a search for a model to adequately fit the data.

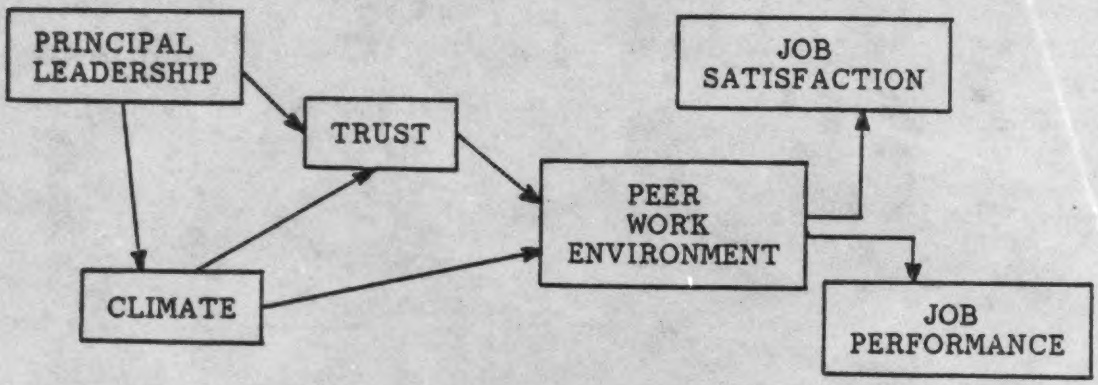
Discussion

After the theory had been operationally defined, the next step was to order the variables and test the resultant model. The process of model testing began with the selection of 15 indicator variables to compose the measurement structure. These subindices were chosen for their high construct validity and for their relatively high correlation with other subindices selected to measure a given latent construct.

The structural model (containing no correlated error terms) of the modified version of the Likert theory was then specified (Figure 7.1).

FIGURE 7.1

STRUCTURE OF THE MODIFIED LIKERT MODEL



When tested, the model fit very poorly. Further modification to the model produced no better results. Undoubtedly, at this point it would have been possible to begin correlating the errors and to then test a series of increasingly interrelated models. A fit could have eventually been produced, but it was believed that the resulting, very complex, structure would have been quite difficult to interpret. The substantive utility of such an approach is questionable, even in an exploratory study such as this.

Given these results, it was decided to reject the research hypothesis. The modified version of the Likert model did not adequately fit the available data. Further investigation appeared to be necessary in order to produce a model or models that could provide a more powerful explanation.

Subproblem Three

Subproblem Statement

The third subproblem was to propose and test alternative causal models which incorporate selected variables from the original Likert model as examined in Subproblem Two.

Research Hypothesis

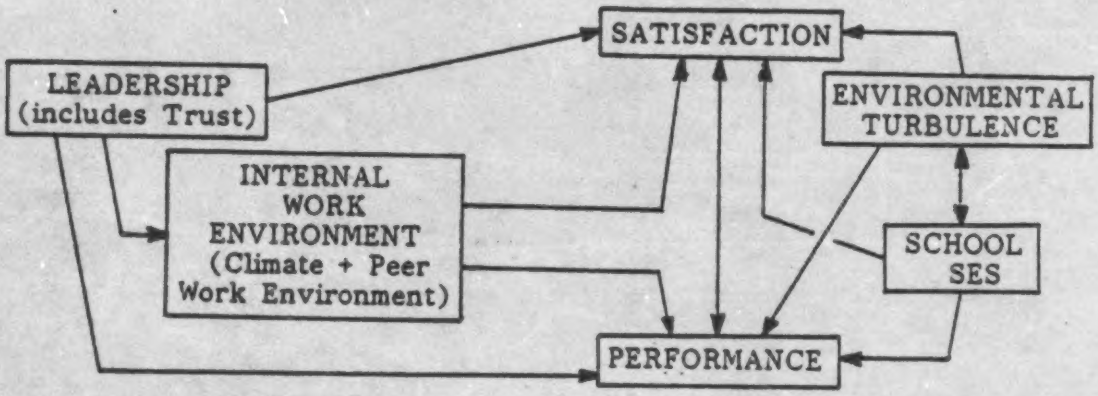
The reseach hypothesis for Subproblem Three was that one or more alternative causal models would better represent the causal relationships among the available variables than would the original model from Subproblem Two.

Discussion

The process of identification of alternative models began with a review of the subindex and index structures utilized in Subproblem Two. After factor analyzing the subindices and examination of the resultant factor loadings, it was decided to respecify both the measurement and the structural models. This resulted in several additional modifications to the Likert model as originally tested. (1) The indicator variables for each index were respecified. (2) The Climate and Peer Work Environment indices were collapsed into a single index, renamed Internal Work Environment. (3) The Trust index was merged into the Principal Leadership index, producing the new index, Leadership. (4) Various additional causal links were postulated between variables. The alternative model containing these modifications is presented in Figure 7.2.

FIGURE 7.2

STRUCTURE OF THE ALTERNATIVE MODEL


SATISFACTION
LEADERSHIP (includes Trust)
ENVIRONMENTAL TURBULENCE
INTERNAL WORK ENVIRONMENT (Climate + Peer Work Environment)
SCHOOL SES
PERFORMANCE

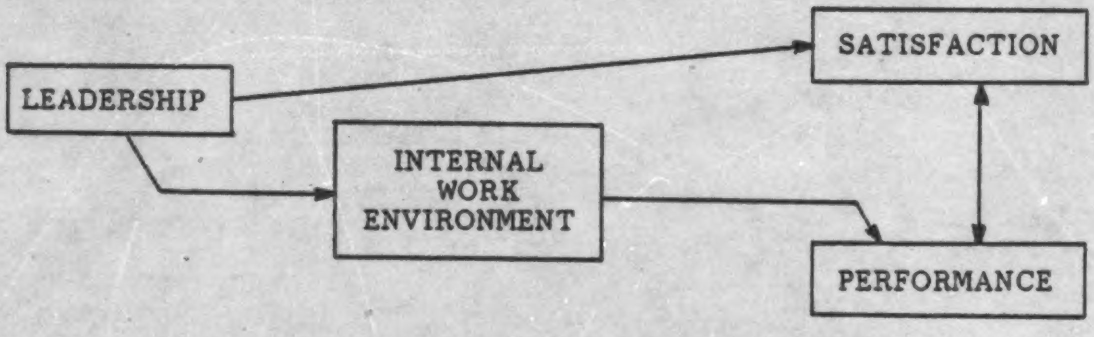
Twelve exploratory hypotheses were then proposed and tested:

(1) Leadership has a direct effect on Internal Work Environment (not rejected).
(2) The relationship between Performance and Satisfaction is not known, but the two are correlated in some manner (not rejected).
(3) Leadership has a direct effect on Satisfaction (not rejected).
(4) The effects of Leadership on Satisfaction are mediated by the Internal Work Environment (rejected).
(5) Leadership has a direct effect on Performance (rejected).
(6) The effects of Leadership on Performance are mediated by the Internal Work Environment (not rejected).
(7) Perceived Satisfaction causes certain behavioral characteristics to be attributed to Leadership (rejected).
(8) Environmental Turbulence directly impacts Satisfaction (rejected).
(9) Environmental Turbulence directly impacts Performance (rejected).
(10) School SES directly impacts Satisfaction (rejected).
(11) School SES directly impacts Performance (rejected).
(12) The relationship between Environmental Turbulence and School SES is not known, but the two are correlated in some manner (rejected).

Ultimately, results of this model testing indicated that four of the postulated causal relationships (Hypotheses 1, 2, 3, 6) should be included in the specification of the final model (Figure 7.3).

FIGURE 7.3

STRUCTURE OF THE FINAL MODEL



Selection of this model as the one model best fitting the data proved difficult for several reasons: (1) School SES did appear to have a moderate causal impact upon Performance and Satisfaction. (2) The uni-directional causal path from Performance to Satisfaction also provided a good fit to the data. (3) The directionality of the causal flow between Leadership and Internal Work Environment cannot be statistically determined, given these data and this analytic approach.

The research hypothesis of Subproblem Three (that one or more better-fitting causal models could be found) was supported. However, final selection of Model I (Figure 7.3) as the best fitting model was made primarily on substantive grounds, and in realization of the limits imposed by the data.

INTERPRETATION

An understanding of the structural model offered as the one best fitting the data requires an examination of the causal linkages occurring among the latent variables. Such an examination, moreover, should include a discussion of not only the linkages actually postulated, but also of those linkages which are notable by their absence. That is, there are certain paths that substantive theory would suggest should be present in such a model (i.e. Internal Work Environment - Satisfaction; Leadership - Performance) and that do not appear. Both of these dimensions of the structural model will be explored. Following this discussion, some general conclusions will be drawn about the overall model that resulted from the data treatment of this study. And finally, the model will be embedded in the typology of organizational effectiveness models that was discussed earlier in the literature review.

Structural Model

As defined earlier, the structural component of a causal model describes the relationships occurring among the observed variables. The structural model is used to describe both the directionality and the magnitude of these causal effects. The model which ultimately emerged as the one judged to best fit the data (Figures 6.4 and 7.3) was composed of four latent variables which could be connected by any of six possible paths. Further, each path could take any one of six possible forms. This resulted in 4,320 potential models, if one allows for all causal linkages. Of this number, 40 were actually proposed and tested.

Leadership

As shown in Figure 7.3, Leadership is defined as the primary causal variable. This construct measures several facets of leader behavior considered to be important to the satisfaction levels of the teaching staff and to the performance of the school as an educational institution. These behaviors included principal supportiveness, ability to encourage teamwork, ability to facilitate job-related tasks, and ability to facilitate vertical communication. These leader behaviors are shown as having: (A) a direct causal effect upon Internal Work Environment, (B) a direct causal effect on Satisfaction, and (C) no direct effect on Performance.

(A) Path from Leadership to Internal Work Environment: This path represents the strongest causal effect found in the model (causal effect = .774, C.R. = 3.65). It shows that the behavior of the leader has a significant impact upon the level of staff cohesiveness and upon the character of the group processes occurring among staff members. The more the principal encourages teamwork and acts in ways which allow participation in decision making, the higher will be the level of cooperation, trust, and accurate information flow within the school staff.

This finding is consistent with those of a number of other investigators who have examined Likert's theories. Lanaghan (1972) found "relations-oriented" principals to have higher scores on ability to motivate teachers and upon adequacy of communication processes. Lepkowski (1970) found that principals who behaved more supportively were more likely to have teaching staffs who rated decision-making practices and communications flow most highly. Mangee (1976) found high correlation between leadership behavior and organizational climate ($r = .83$).

Other researchers have reported similar findings, especially in regard to the influence of leaders upon the creation of "trusting" and results oriented climates (Gibson, Ivancevich, & Donnelly, 1973; Litwin & Stringer, 1968; Schneider & Bartlett, 1968; Steers, 1977). Stogdill (1974), however, after his extensive review of the leadership literature, suggests that the issue remains a cloudy one. This view is echoed by Dachler and Wilpert (1978, p. 1), who attempted to draw conceptual boundaries around what they term the "many and often contradictory issues which are discussed in the literature." Stogdill (1974) further suggested that the only clear impact of participative leadership style upon work group process is in the area of readiness for participation in organizational change activities. Hersey and Blanchard (1972), building upon the work done at Ohio State, argue that a participatory leadership style is most effective only for moderately mature work groups. Work groups exhibiting either more or less maturity are more effectively led by other leadership styles. Finally, it should be noted that Franklin (1973, 1975b) found no relationship between the managerial leadership and group process variables. Since his Group Process construct closely resembles the Internal Work Environment factor of the present study, the present results appear to contradict those reported by Franklin.

(B) Path from Leadership to Satisfaction: This path (causal effect = .289; C.R. = 2.60) is also a significant one. The path indicates that principal behavior has a strong direct effect on the level of satisfaction expressed by the teaching staff. This result is supported by several studies utilizing the Likert conceptualization. Chung (1970) found teacher centered managerial style significantly related to teacher job satisfaction (r = .50). Shaw (1970) also found leadership and satisfaction significantly correlated among secondary school teachers (r = .72). Thompson (1971) found more supportive supervisory styles to be related to higher levels of school administrator satisfaction.

A number of studies have also been conducted relating the Systems 1-4 continuum to teacher satisfaction (Byrnes, 1973; Morall, 1974; Prieto, 1975). All of these studies found that principals whose behavior is further toward System 4 (participative) had teaching staffs who were more satisfied than were those whose leadership was rated toward System 1. Similar results have been reported in the private sector (Bowers & Seashore, 1966; Myers, 1966; Pennings, 1976).

It should also be recalled that the leadership construct, as operationalized in the present study, bore some resemblance to the two primary leader behaviors identified by the Ohio State leadership studies (Halpin & Winer, 1957). A large number of studies have related these scales--Consideration and Structure--to satisfaction. Stogdill's (1974) review showed that 12 of these studies reported positive relationships between consideration and satisfaction, while 10 reported positive relationships between satisfaction and structure. Only two studies showed negative relationships, while four showed no relation.

None of the studies reviewed above allow for the strong inference of causality. Most report correlational data, and a few are descriptive. Those that do report correlations between leadership and satisfaction usually make the conceptual leap from correlation to causality (including both directionality and magnitude).[55] As discussed earlier, recent work using an attribution approach has questioned some of the conclusions based on studies of this type. At this point it is unclear as to whether leader behaviors somehow cause follower satisfaction, or if they are the reported results of some level of follower need fulfillment. At any rate, the point to be noted here is that, while most of the studies found in the literature tend to support the notion that leadership somehow causes satisfaction, it is not possible to draw direct parallels between this general body of work and the present study.

(C) Absence of a Direct Effect of Leadership on Performance: The present study found no direct causal effect of Leadership on Performance. Instead, leader behaviors were mediated by aspects of the internal work environment. This finding is in apparent contradiction to the early leadership theorists of the "human relations" school (Lewin, 1938; Mayo, 1933), who envisioned a relatively simple relationship between leadership and the outcome variables of performance and satisfaction. In recent years these relationships have been extensively studied

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[55] Locke (1976) calls this the "method of correlation with speculation" because no alternative causal explanations are ever seriously examined. He further suggests that supervisory behavior is only one of seven possible antecedents to individual satisfaction.

--resulting in a greater appreciation of the complexity of the causal linkages involved. The various contingency models of leadership (Fiedler, 1965; House, 1971; Vroom & Yetton, 1973) have been developed in recognition of the dynamic interplay between a number of factors affecting the impact of a leader upon the organization, the work group, and the individual. These factors include leader characteristics, subordinate characteristics, the nature of power relations, the nature of the task, time, organization climate, organization structure, and various elements located in the external environment.

The present study addressed only three of these factors (leadership behavior, climate, environmental factors) and these only partially. Given the complex interrelationships believed to exist and the narrow definition of the factors in the present study, the absence of a direct Leadership - Performance effect may be attributed to operationalization error or perhaps even to chance.

Internal Work Environment

Internal Work Environment is a mediating variable. As defined in the present study, it describes a number of dimensions which characterize the day-to-day working environment of the school. Such an environment is one in which teamwork and cooperation is present and encouraged, high levels of trust are maintained, and communication flows freely. As depicted in Figure 7.3, Internal Work Environment is shown as having: (A) a direct causal effect on Performance and (B) no direct effect on Satisfaction.

(A) Path from Internal Work Environment to Performance: This path is significant (causal effect = .335, C.R. = 2.96) and indicates that certain internal processes occurring among the school staff have a fairly strong impact upon the performance of the school. Like the Leadership - Performance path, the causal linkages between these group processes and performance are not well understood. In addition, there is much disagreement in the literature as to just what the factor (variously called internal climate, organizational climate, group process, tone, or work environment) actually measures.

Hellriegel and Slocum (1974, p. 256) offer a very broad definition of the climate construct:

> "Organizational climate refers to a set of attributes which can be perceived about a particular organization and/or its subsystems, and that may be induced from the way that organization and/or its subsystems deal with their members and environment. Several themes are implicit in this definition of organizational climate: (a) perceptual responses sought are primarily descriptive rather than evaluative; (b) the level of inclusiveness of the items, scales, and constructs are macro, rather than micro; (c) the units of analysis tend to be attributes of the organization or specific subsystems rather than the individual; and (d) the perceptions have potential behavioral consequences."

If this definition is accepted, then it is possible to relate the results of the present study to the main body of the climate literature.

While the evidence remains equivocal, there does appear to be a significant relationship between climate (Internal Work Environment) and performance (Friedlander & Greenberg, 1971; Hall & Lawler, 1969; Kaczka & Kirk, 1968; Pritchard & Karasick, 1973; Schneider & Hall, 1972). What is not clear, however, is the means by which a given climate affects the organization's performance. There is some evidence that climate, like leadership, interacts with a number of other factors, including individual needs, goals, motivation levels, and skills (Steers, 1977). The exact manner in which this interaction occurs, however, remains unclear.

(B) Absence of a direct effect of Internal Work Environment on Satisfaction: There is no causal linkage between the Internal Work Environment and Satisfaction variables, although, as was noted earlier, attempts were made to fit such a path. These attempts were made primarily because a positive relationship between these constructs has often been reported in the substantive literature (Friedlander & Margulies, 1969; Kaczka & Kirk, 1968; LaFollette & Sims, 1975; Litwin & Stringer, 1968; Pritchard & Karasick, 1973). These studies indicate that climates evidencing high concern for people, as shown by high degrees of participation, openness, trust and information exchange, help produce more satisfied employees. Further, at least one author (Johannesson, 1973) believes that the climate and satisfaction constructs are related so closely that they actually represent two factors of the same latent construct. This belief is echoed by Campbell et al. (1974), who suggest that certain findings reported by Taylor and Bowers (1972)--using the SOO--are indicative of a similar phenomenon. Steers (1977), however, after reviewing a number of climate studies, reports that the magnitude of the relationship between climate and satisfaction is not too great. He suggests that this points to the presence of other intervening factors, of which various individual characteristics are most likely.

The finding reported here (of no direct effect) is still somewhat puzzling. One possible explanation may lie in the fact that the present study did not measure any individual characteristics (i.e. motivation levels, level in the organization, years teaching, etc.). Perhaps these characteristics may have combined in some way to cancel out the actual effect of the internal work environment processes on satisfaction levels. It could also be that the *organizational* climate of schools has a much smaller impact on the satisfaction of the teaching professional than does classroom climate or knowledge about how well the school performs as a total organization.

Performance and Satisfaction

As depicted in the final model shown in Figure 7.3, levels of Performance (causal effect on Satisfaction = .661; C.R. = 2.63) and Satisfaction (causal effect on Performance = .623; C.R. = 2.63) have a reciprocal influence on one another. This finding lends support neither to the performance-causes-satisfaction, nor to the satisfaction-causes-performance explanations for these interrelationships.

The early, perhaps simplistic, notion that the "happy worker is a productive one" as suggested by the human-relations theorists has been superceded in recent years (Brayfield & Crockett, 1955; Vroom, 1964). For a time the reverse position, that known levels of performance affect individual levels of satisfaction, was in ascendance in the literature (Lawler & Porter, 1967; Locke, 1976), although some findings continued to be reported that challenged the latter view (Herzberg et al, 1957; Likert, 1961).

This controversy has been reopened in the latter half of the 1970's (Lorenzi, 1978; Organ, 1977, 1978) with the predictable realization that the interrelationships of these constructs are much more complex than originally believed. Currently, evidence seems to point toward the presence of a third variable (or variables) which mediate the effects of performance and satisfaction upon one another. One such variable--reward--was first proposed by Lawler and Porter (1967) as a mediator between performance and satisfaction. These authors suggested that the degree to which a person is rewarded for work-related behavior has a major influence on level of satisfaction. Further, this reward has to be tendered in proportion to the actual quality of performance as perceived by the employee. Locke (1976) concurs with this view, but also stresses that causality proceeds in both directions in this relationship. He does believe, though, that the satisfaction-causes-performance linkage is by far the most complex, since it must, of necessity, address the extremely complex area of individual need satisfaction.

The findings of the present study are most similar to those discussed by Locke. That is, satisfaction impacts performance and performance, in turn, impacts satisfaction. The question of causal precedence cannot be addressed by the model developed for this study.

Conclusions

The current study was conceived as an exploratory, model-testing one, and the model(s) resulting from this process must be interpreted with this in mind. It is in no way intended that the final model proposed as the best fitting one be thought of as one that has wide generalizability. What was intended was that this study should be viewed as an attempt to use a causal modeling approach to the analysis of problems occurring in the substantive field of educational administration. The data, while not perfectly suited, were amenable to this form of analysis. It is hoped that future research will move both the analytic process and the substantive findings further down the road toward more useful applications.

Nevertheless, it may be interesting to speculate upon the meaning of several of the findings of the study. A good place to begin is with a brief discussion of just how an effective organization is defined as a result of these analyses. Following this, the model of effectiveness will be summarized in relation to other effectiveness theories and in view of the Likert approach to the study of effectiveness in schools.

What is an effective school organization? According to the model depicted in Figure 7.3, an effective school is one in which:

- The school is perceived as doing an adequate job in the performance of its educational mission. This perception is shared by both parents and students, the ultimate "clients" of the system.
- Educational goals for the school are agreed upon by those most affected by the process: parents, students and teachers.
- Student absentee rates are low, reflecting a high degree of commitment by students and parents to participation in the educational process.
- Teachers, the main providers of the educational product, are highly satisfied with the school organization in general.
- Teacher satisfaction with levels of influence in decision making is also high.

The major factors which impact or cause a school to be effective are:

- The principal is perceived as an educational leader, one who is capable of building a strong, cohesive teaching team.
- The principal encourages the free flow of communication throughout the school, horizontally as well as vertically.
- The principal is supportive of new ideas, of risk taking behavior on the part of the teaching staff.
- The principal facilitates the educational process by providing both expert advice and guidance and the necessary resources for the accomplishment of the school's mission.

- The internal working environment is one where teachers are supportive of each other. Trust in other professionals is high. Cooperative, collaborative group processes are the norm, rather than more competitive, win-lose behavioral strategies.

- Teachers contribute significantly to the horizontal flow of communication. Neither subject matter departments nor grade levels are isolated from one another or from the mainstream of the school.

- The internal environment helps foster the use of participative decision making pratices at all levels.

The processes by which the causal factors influence the school's performance and level of teacher satisfaction include:

- The principal is the primary causal agent. Principal leader behavior sets the tone for the internal climate of the school. The leadership provided by the principal encourages the formation of a supportive, cohesive, trusting team which is amenable to the idea of participative decision making.

- School performance is partially a result of these leader behaviors, as filtered by the participation-oriented work group. Performance is also affected by the satisfaction level of the professional staff.

- Teacher satisfaction is affected primarily by objective feedback or individual perception as to how well the school is performing its mission.

- Satisfaction may also be affected by the perceived ability of the principal to provide rewards for high quality teaching performance.

- The internal working environment has no direct effect on the level of teacher satisfaction, although it may have indirect effects, as mediated by the level of school performance.

Several unresolved issues remain. Three of the primary ones are:

- The directionality of the causal processes is not absolutely certain. Substantive theory would suggest that leadership and group-process variables impact satisfaction and performance. Equally likely, at least from an attribution-theory perspective, is that the causal flow is reversed. Satisfaction of individual needs may lead to the attribution of certain behavioral characteristics to the principal. In a like manner, information about performance levels might influence the perception of the team climate and principal leadership styles.
- There are an unknown number of unmeasured constructs which probably impact the satisfaction and performance outcomes. These include perceived reward satisfactions, individual teacher characteristics, individual motivation levels, amount of desired autonomy, school district policies and practices, organizational structure, and the socioeconomic status of the community in which the school is located.
- The exact nature of the performance - satisfaction relationship is not clear. There is some evidence to support the proposition that one-way causality exists from performance to satisfaction.

The model which emerged as the one best fitting the data from the SOS can best be described as belonging to the systems paradigm of the organizational effectiveness construct. The only goal-attainment facet of the model is the factor which measured level of agreement or consensus on organizational goals. No attempt was made to measure progress toward attainment of any goals, regardless of the level of agreement. The model is a systems one, focusing on the leadership and work group subsystems. The perceptions of multiple constituencies[56] are addressed, since the opinions of teachers, students and parents are included in the evaluation of the organization's performance.

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[56] The multi-constituency view of effectiveness is frequently encountered in the literature. The central position of this viewpoint is that all organizations serve multiple "client" groups, be they managers, employees, or consumers. Of necessity, effectiveness is defined in different ways by these different groups (Connolly, Conlon, & Deutsch, 1980; Cunningham, 1977; Hitt & Middlemist, 1979).

When compared to the various operationalizations of the Michigan-ISR approach to the study of effectiveness (Bowers & Seashore, 1966; Franklin, 1973; Taylor & Bowers, 1972), it is apparent that the "essences"[57] of Likert's ideas are retained. Many of the indicator variables are defined similarly, as are most of the latent constructs. Major points of agreement include:

- The role of the leader is central to the effective functioning of the organization. Important leader behaviors include the provision of a supportive environment for the school staff and the facilitation of task-related endeavors.
- The role of the work group is also important. For purposes of the present study, the work group was conceptualized as the entire teaching staff.[58] While this is by no means the ideal structure, according to Likert, it does reflect the current design of many schools in the United States. Important processes occur within the work group of the school, including information exchange and the maintenance of cohesive work teams.
- The System 4 concept of participative management is also addressed in the present model. Although not measured directly, it is reflected in a number of the leader and internal work group processes that were actually examined.

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[57] Kenny (1979) presents an excellent discussion on the limits and uses of causal modeling. He cautions that the appoach be used with care and sensitivity and with the awareness that science is, in reality, nothing more than the search for images with which to characterize processes.

[58] Following Likert's assertion (Siepert & Likert, 1973, p. 12) that "In most schools and school districts at present, there are serious differences in their organizational structure. When evaluated against the System 4 model, their structure is recognized as lacking appropriate multiple overlapping groups linked by persons with dual membership as linking pins between these groups."

Finally, the Group Process construct originally examined in detail by Franklin (1973, 1975a, 1975b) was also investigated by the present study.

- Results of this investigation failed to support Franklin's contention that the managerial leadership variable does not predict to the group process variable.

IMPLICATIONS AND RECOMMENDATIONS

A number of possible implications and directions for future research are suggested by examination of the results obtained from this analysis of the Study of Schooling data. These will be addressed to both needs for future research and to implications having some utility for the theory and practice of organizational change and development.

Future Research

Although the focus of the present study was on the use of the structural equation approach to the analysis of organizational data--a methodological issue--both methodological and substantive implications will be examined here.

Substantive Issues

Several issues raised by the present analysis are relevant to the study of organizational behavior. These include:

(1) The discipline imposed on a substantive theory by the requirements of causal analysis should not be ignored. The structural equation approach forces the scientist to analyze all aspects of the model or theory being proposed and/or tested. From the earliest theoretical operationalization to the final analysis of the causal paths, the theory is subject to continuous scrutiny.

Once some aspect of organizational life has been selected for study, it is then necessary to select the relevant latent constructs to be measured, and to determine the indicators that will be used to measure them. This process requires the researcher to make choices among competing constructs and criteria--the "building blocks" of the causal approach. In order to make such choices, the researcher must make conscious and challenge any assumptions that he or she may hold about the importance of the various constructs and how they may best be measured. Once the measurement model has been developed and the data collection designed, the original theoretical operationalization must be reexamined in light of constraints imposed by the research design. Again, the theoretical model is scrutinized, since choices and trade-offs must be made in order to deal with problems inherent in research conducted in real organizational environments.

Finally, the causal ordering of the latent constructs represents the best informed speculation that the investigator can offer as to the relationships that exist among the variables of the theory. This requires that the researcher examine, to one degree or another, all paths allowed by the model. Some will be discarded as patently implausible. Others will not be so easily dismissed. As each possible path is traced from variable to variable, three factors must be considered: (a) the type of relationship (correlation, one-way causality, reciprocal causality, etc.); (b) directionality; and (c) the magnitude of the expected relationship or causal effect. This disciplined approach can result in the specification of model configurations which may not otherwise have been considered.

(2) As discussed previously in the Conclusions section of this report, there may be one or more latent constructs which either underlie

the total model or intervene between parts of the model as presently specified. To address the first point, it remains possible that a single latent construct might actually underlie the total model. The existence of this third level of measurement was not examined, so it cannot be eliminated as a possible explanation of the results. Until recently it had not been possible to examine such third order variables. However, new improvements to the structural equation approach have been devised by Bentler (1980) and others which may prove helpful in future research into the nature of effectiveness. Perhaps organizational effectiveness is, after all, a unitary construct, requiring a multiple-level approach for accurate description. These recent methodological advances could reopen an area of inquiry long dormant in the literature.

The discussion of the possible existence of intervening variables that were not measured in the present study focused on the reward construct as possibly intervening in the unclear relationship between school performance and teacher satisfaction. Other such factors may also be important. Individual autonomy, for example, might intervene between internal work environment and performance, or it might be part of another discrete construct tapping various facets of the individual personality.

In this regard other, more global, models of the effectiveness construct should be operationalized and tested. Such models should include more complete specification of variables not addressed in the Likert-ISR approach to the topic. Steers (1977), for instance, offers a more complete model, based on his synthesis of a number of earlier studies. This model is defined in causal language, but has not, to date, been empirically tested.

(3) It will be recalled that an investigation was conducted concerning the possible existence of an attributional explanation for the model finally selected as the best fitting one. The present study was not able to determine whether the attribution explanation might, in fact, be applicable. This area should be investigated further, using other sets of data collected in different ways, probably using a time wave design.

(4) In a somewhat unexpected finding, there was no direct relationship found between the internal work environment of the school and the level of aggregated individual teacher satisfaction. One suggested explanation was that perhaps teacher satisfaction, even satisfaction with the total organization, might be more a function of processes occurring within the classroom environment. Further causal studies should be undertaken to illuminate this relationship. They should focus on clarifying the relative importance of several causal factors influencing satisfaction, including (a) organizational group process vs. classroom processes; and (b) the impact of perceived ability and willingness of the school to reward high level performance.

Methodological Issues

A number of methodological issues and recommendations can be made, based on the results of the study. Several of these issues have already been addressed, while others will be mentioned here for the first time:

(1) The use of multivariate studies should continue. There still remains some merit in the conduct of comparative studies in organizations, even though it is becoming increasingly clear that effectiveness is probably not a global construct. That is, effectiveness must be un-

iquely defined for each organization, or at best, for each type of organization. Perhaps some global measures of effectiveness could be developed for secondary schools, say, or public secondary schools, private elementary schools, etc. To do this would require the inclusion of data from a large number of schools, with the school as the unit of analysis. Multivariate procedures offer an effective way of handling the massive amounts of data such studies would generate and structural equation modeling provides the researcher with additional explanatory power, in that causal relationships may be more accurately defined and examined.

(2) Such broad scale studies attempting to develop models of school effectiveness should also expand their circle of data sources beyond those included in the present study. The present study focused on the life of teachers in schools and included only a small amount of data from parents and students. Future studies should include more responses from data sources other than teachers, especially from those who "consume" the product--students, and from those who pay the bills--parents and members of the community at large.

(3) Cross lagged panel (CLPC) designs should be employed wherever practical. The present study was conducted using cross-sectional data. Inferences drawn from these data are not as strong as they could have been, had they been based on longitudinal data. One method of handling longitudinal data is the cross lagged panel correlation structure first advocated by Campbell (Campbell & Stanley, 1963) and later elaborated upon by Cook and Campbell (1976). Kenny (1979, p. 227) provides a short summary of the components of the technique:

> "In its simplest form CLPC involves two constructs, say X and Y, measured at two points in time, say 1 and 2. There are then four variables, X_1, X_2,

> Y_1, and Y_2 and six correlations: two synchronous correlatons, ρX_1Y_1 and ρX_2Y_2, two autocorrelations, ρX_1X_2 and ρY_1Y_2, and two cross-lagged correlations, ρX_1Y_2 and ρX_2Y_1. As the name suggests, CLPC is the comparison of the cross-lagged correlations which can be expressed as a cross-lagged differential: ρX_1Y_2 minus ρX_2Y_1."

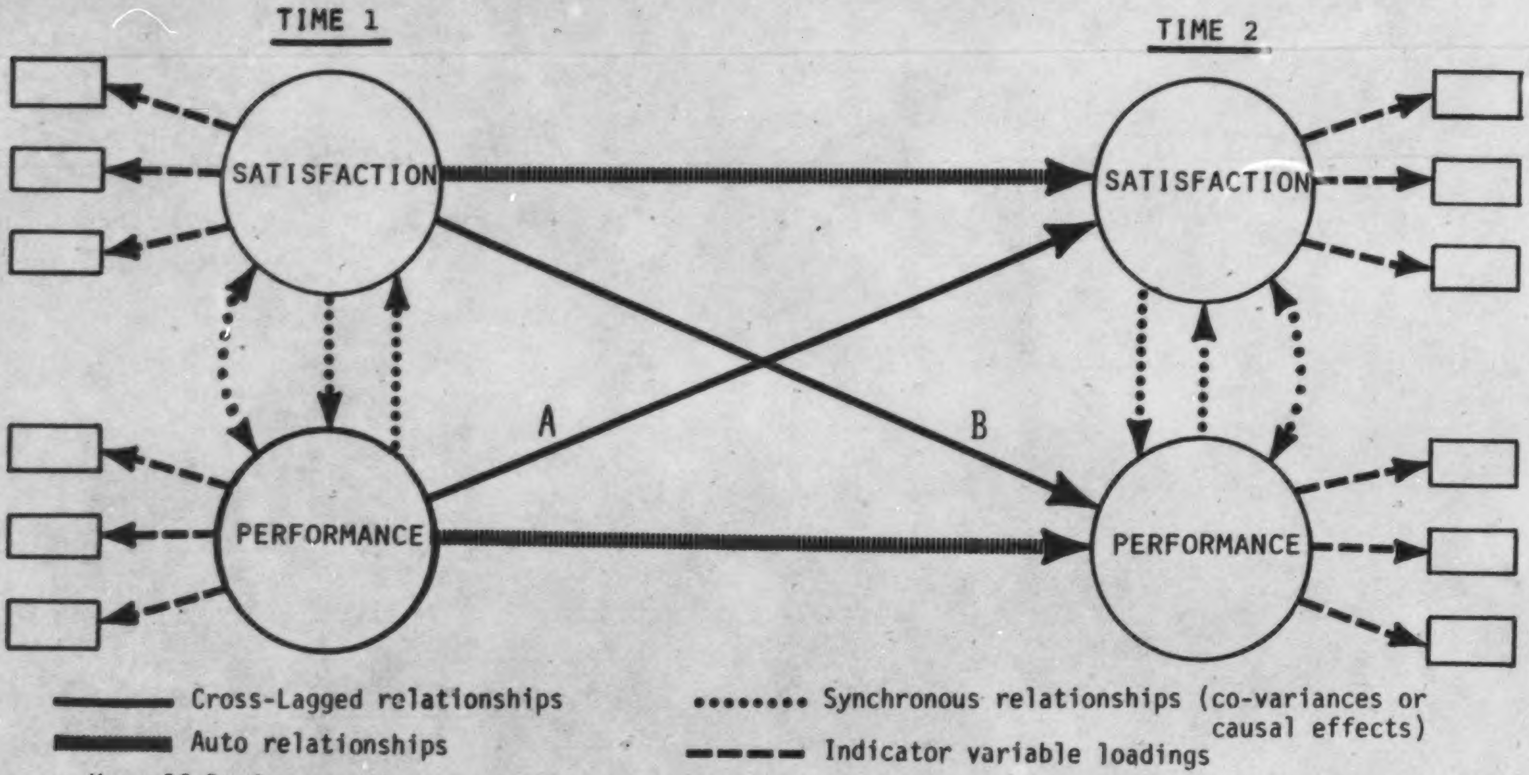
Both Kenny (1979) and Wingard (1979) have suggested that cross lagged panel techniques be combined with the structural equation approach. Such a measure offers the researcher the advantages of both and can strengthen causal inferences derived from the available data.

Figure 7.4 presents a design which could be used in examining the performance - satisfaction relationship that proved somewhat problematic in the present study. It should be noted that normal structural equation procedures are followed in testing the data collected at each point in time. For both points, the same data must be collected, the same models specified. If the performance-causes-satisfaction hypothesis is true, then not only are the values of the paths between the two variables in the expected direction at a single point in time, but they must also be in that direction over time. The additional data allows for stronger prediction.

(4) Alternate models should be specified for the testing of any substantive theory. Jermier and Schriesheim (1978) have provided an excellent discussion of the possible negative consequences accruing from the lack of alternate model specification. Without going into great detail, the obvious results of failing to specify alternatives are (a) that cause-effect relationships may be oversimplified; or (b) that equally likely or even more plausible causal linkages may be missed.

FIGURE 7.4

POSSIBLE CROSS-LAGGED PANEL DESIGN
FOR COMPARISON OF SATISFACTION AND PERFORMANCE


TIME 1
TIME 2
SATISFACTION
SATISFACTION
PERFORMANCE
PERFORMANCE
A
B
Cross-Lagged relationships
Auto relationships
Synchronous relationships (co-variances or causal effects)
Indicator variable loadings

H_1: If Performance impacts Satisfaction, then causal effect A will be greater than causal effect B. Causal effect B should be lower or nonexistant. In addition, the Performance-Satisfaction path will be high at Time 1 and Time 2.

Bentler and Bonett (1979)[59] have developed a new technique for the comparison of alternative theoretical structures. The technique involves the specification of several models and the comparison of the amounts of variance accounted for by each of them. They suggest using this technique in conjunction with the chi square goodness of fit testing procedures (as were utilized in the present study).

(5) If the model developed as a result of the present study is to have maximum validity, one or more confirmatory studies should be conducted. This would involve the selection of a comparable sample of schools and the collection of the same type of data. These data would then be run through the model. The extent to which the model allows for the prediction of actual scores tests the adequacy of the model. This would move the present study out of the realm of exploration and into the area of model testing and verification.

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[59] See also Wingard (1980) for a discussion of the application of the Bentler-Bonett technique. The steps involved in this approach include:

1. Specify a null model (H_0), with all variables uncorrelated.
2. Fit the null model using LISREL. Goodness of fit testing results = X_0^2.
3. Specify a substantive model (H_1).
4. Fit the substantive model. Goodness of fit testing = X_1^2.
5. Compare H_0 to $H_1 = \dfrac{X_0^2 - X_1^2}{X_0^2}$
6. Etc....

The result of this procedure is the proportion of the original variance of that substantive model that is accounted for, relative to the null model.

Practice of Organizational Change and Development

While this study was primarily exploratory and was frequently concerned with methodological issues, a number of practical implications can also be inferred from the results. These implications, along with some relevant recommendations, will now be discussed.

(1) Examination of the topic of organizational effectiveness cannot be avoided if the OD practitioner desires to provide the highest quality services to client organizations. The causes for this are twofold. First, study of research findings related to the topic can help the practitioner stay informed of advances in the theoretical domain. In fact, the effectiveness literature could be viewed as a much needed unifying theme in a field characterized by an extremely eclectic and sometimes rather fragmented theory base. Secondly, the effectiveness construct can be an invaluable organizing principle around which to structure interventions into a given system. Once the criteria for organization and subsystem effectiveness are defined (by the client), it then becomes possible to point the intervention strategy toward the enhancement of the effectiveness indicators.

Measurement of the effectiveness of a school organization can provide both the change agent and the system with baseline data against which to evaluate the success or failure of change activities. The most useful way to obtain such baseline data would be to develop a semi-tailored effectiveness model, designed to include variables pertinent to school systems in general as well as variables more sharply focused on the specific school or schools concerned. Such a "contingency" model would not be restricted to any pre-conceived approach to the study of effectiveness (e.g. the natural systems, rational goal, organizational development or functional models). Instead, the approach used would be a function of the needs of the client system and the skills of the practitioner/evaluator.

The specific problems or target areas identified by the client would provide primary guidance as to the strategic effectiveness model employed by the consultant. If the problems lie with the measurement of the human resource subsystem, an organizational development model such as the Beckhard (1969) or Blake and Mouton (1964) approach might be employed. The Likert model as tested here (basically a natural systems one) could profitably be used to examine the specific dynamics associated with work groups and their linkages to the rest of the system. Other models could be used to address other problem areas, perhaps in combination with one another.

Data collection and feedback could be accomplished by a modified survey feedback program. Once the model had been decided upon (as a result of a collaborative process involving in-depth interviews and face to face meetings between the client system and the practitioner) the model would be operationalized. A survey instrument would then be developed and administered, again in conjunction with the client system. After the survey was completed, data would be analyzed and fed back to the system for further decisions concerning implications and possible intervention points. The collaborative effort involved in building such a model and developing such a survey constitutes an intervention into the life of the organization. Issues may be raised which were never before discussed. A new vocabulary will be built within the system and both managers and employees will learn to speak it. The processes involved in conducting systematic surveys--periodic "temperature checks" on the organization--can also be learned and run in-house. And, lastly, expectation levels will rise as the organization is seen as attempting to solve some of its identified problem areas.

(2) Principal leadership plays a crucial role in the model developed as a result of this study. The school principal is seen as having a great impact on the internal working environment experienced by the teaching staff. The principal's efforts in this regard are seen as critical in providing an internal climate that is conducive to high performance. Although the direct effect of leadership behavior on staff satisfaction is lower than the effect on work environment, the principal also plays an important part in helping to keep individual teacher satisfaction high. These findings point to a simple axiom for change agents: When in doubt, work with the leader. Other intervention strategies may not be nearly as cost-beneficial in either energy, time, or monetary units consumed, per increment of improvement.

Intervention strategies which can be used to enhance leader effectiveness include those aimed at:

- Selection: Early identification and grooming of potential leaders can increase the depth and quality of the organizational leadership pool.
- Training: Good leaders are not born, they are also well-trained, well versed in current managerial theory. Particular areas of emphasis should include organizational behavior modification, participative decision making, team development skills, and interpersonal communication skills.
- Reward Systems: The organizational reward structure should be such that desirable principal behavior is rewarded. In addition, the principal should be given more discretionary power over the reward system used for teachers. In this way the principal's effectiveness

can be enhanced as a result of his/her perceived ability to reward goal-directed performance.

- Sociotechnical Systems: Job design/redesign, job enrichment, etc., can have a powerful impact on the effectiveness of the leader. As lines of communication, areas of authority/responsibility, and role definitions are shifted and clarified, the effective power of extant leaders can be enhanced.

(3) The possibilities inherent in other intervention strategies should not be overlooked, especially those related to the school climate. The internal environment of the school plays a significant part in determining how well the school will perform its educational mission. If the school's performance is poor, one way of working with the problem is to enhance the quality of the various group processes which occur among the teaching staff.

Since its beginnings, the field of OD has had as one of its primary concerns the improvement of group processes within organizations. As a result, a large number of intervention techniques have been developed to deal with problems in this area. These include team building, conflict management, communications training, and the various interventions directed toward improvement of interpersonal relations (T-groups, etc.). Given a fairly well thought out "kit bag" of available interventions, the practitioner can exert a good deal of leverage for change through the medium of the internal climate.

As was noted earlier, the model shows no direct link between the internal work environment and the level of teacher satisfaction. At first glance this finding appears to run counter to much of the literature on the relationship between these two constructs. However, the model does allow for an indirect effect with performance being interpreted as the intervening variable between work environment and satisfaction. Interpretation of this finding suggests several very different sets of recommendations. First, if the level of group processes occurring within the school staff have little or no impact on satisfaction, then change strategies aimed at improvement of these processes will have little or no effect on teacher satisfaction levels. Secondly, satisfaction should be increased by both improvement of the quality of the principal's leadership, and by rewarding high quality teacher performance. Thirdly, if teacher satisfaction is primarily a function of classroom climate, then strategies aimed at the improvement of these processes should be attempted. Such techniques (and practitioners to implement them) are readily available in many school districts.[60]

(4) Performance is the raison d'être of the school organization. The school performs well when it is educating students to the satisfaction of those most directly affected--students and parents. As already noted, performance improvements can be expected by working with the teaching staff to improve their level of cooperation, trust, communication and intra-organizational cohesiveness.

There also appears to be a significant effect on performance caused by the level of teacher satisfaction. If the model developed in this study is accepted, it suggests that satisfaction is quite readily influenceable by the behavior of the school principal. Both of these variables, the internal work environment and teacher satisfaction, are influenced by the leader and, consequently, provide the linkage between principal behavior and performance-related outcomes.

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[60] Schmuck et al. (1977) provide an excellent summarization of these techniques, as well as suggestions for their usage.

(5) Teacher satisfaction, while not the primary responsibility of the school, is obviously still of vital concern to any school administrator wishing to maintain high levels of school performance. Satisfaction, as we have seen, impacts performance, and performance, in turn, affects satisfaction. The latter causal relationship is probably enhanced by: (a) the principal's facilitation of adequate and timely feedback, relative to the overall performance of the school; and (b) by the attachment of good teaching performance to the reward system of the organization. If high quality performance is to be rewarded, then two things, neither of them easy, must happen in schools. First, some agreement must be reached concerning a definition of high quality teaching. Such a definition does not now exist. A definition of quality teaching, of individual effectiveness, if you will, must be highly idiosyncratic, in much the same way that organizational effectiveness is tailored to organizational type and specific organization.

Secondly, reward systems must be adjusted so as to positively reinforce the desired performance-related behavior. Current reward structures, based primarily on longevity, seniority and tenure, are designed to reward persistence and devotion. While these may be desirable traits and may represent a part of any idiosyncratic definition, they certainly do not cover the entire spectrum of desired behavior. Perhaps some modified Management By Objectives (MBO) approach could be used as an aid to tying the reward structure to the accomplishment of goals contributing to the effectiveness of the school as an organization.

It is recognized that neither of these recommendations would be easy to implement in school systems as they exist today. Nevertheless, it is the duty of the responsible change agent to continuously hold (and share) some vision of an idealized future state. Organizational shortcomings must occasionally be addressed, and sometimes relatively unpleasant remedial strategies need to be suggested.

AFTERWORD

The ultimate value of this study will be determined by the degree to which it demonstrates the potential utility of an organization-specific, causal analytic approach to the study of organizational effectiveness. As an exploratory study the resulting model(s) were not designed to represent finely-honed approximations to reality. Rather, they were specified, tested, and interpreted more as demonstrations of the technique than as polished finished products.

It is to be hoped, however, that this will not detract from the supportive findings relative to the Likert approach to the study of effectiveness. The utility of his concepts as heuristic tools was not found wanting, even though his model, as originally tested, did not fit the data from the Study of Schooling. It may be that the value of the Likert approach lies not in its great predictive power. Rather, its value may be as a "cognitive map," to be used in guiding working managers in analysis of their own organizational systems and problems. That the theory is amenable to causal analysis may be incidental to this wider application in the real world of educational organizations.

APPENDIX A

ITEM-BY-ITEM COMPOSITION OF INDICES AND SUBINDICES

NOTE:
- Items are numbered in accordance with the IDEA variable identification system.
- Response scales are as noted.
- Items are reversed as appropriate.

LEADERSHIP

The Leadership index deals with teacher perceptions of various aspects of principal job-related behavior. It is an exogenous variable and consists of seven subindices. (All IDEA "C" variables are measured on a six-point Likert scale ranging from 1 [strongly disagree] to 6 [strongly agree]).

(a) Support by principal. Measures extent to which principal is seen as friendly and supportive. (LEADPSPT)

C38. The principal's behavior toward the staff is supportive and encouraging.

C61. Staff members never get support and encouragement.

(b) Principal receptivity to teacher ideas. Measures extent to which principal encourages teachers to offer suggestions about both academic and nonacademic matters. (LEADIDEA)

C23. The principal encourages teachers to experiment with their teaching.

C94. The principal frequently seeks out the ideas of staff members.

(c) Principal goal emphasis. Measures extent to which principal encourages high goal attainment among the staff. (LEADGOAL)

C5. Goals and priorities for this school are clear.

C35. The principal inspires staff members to work hard.

C69. The principal sees to it that staff members perform their tasks well.

(d) Principal team building. Measures extent to which principal uses group methods in problem solving. (LEADTB)

C21. The principal encourages "team work".

C63. The principal uses group meetings to solve important school problems.

(e) Principal work facilitation. Measures extent to which principal secures needed resources, facilitates the planning process, and acts as an expert resource on school-related matters. (LEADWFAC)

C1. Staff members have all of the information they need to have in order to do their jobs well.

C17. The principal sets priorities, makes plans, and sees that they are carried out.

C54. The principal helps staff members to improve their performance.

(f) Principal/teacher decision making. Measures extent to which teachers feel they are involved in decisions affecting their work. (LEADPTDM)

C14. People are involved in making decisions which affect them.

C34. I feel that I can have input regarding important decisions that affect me.

C49. The principal usually consults with other staff members before he/she makes decisions that affect them.

(g) Principal communication. Measures extent to which teachers believe upward communication is adequate. (LEADCOM)

C18. The principal knows the problems faced by the staff.

C97. Staff members feel free to communicate with the principal.

CLIMATE

The Climate index describes teacher perceptions of facets of the internal environment of the school. These facets are those most heavily influenced by groups at higher levels in the hierarchy. It is an endogenous variable and consists of four subindices.

(a) Goal commitment: school. Measures locus of performance goals. (CLIMGOAL)

C73. Staff members maintain high standards of performance for themselves.

(b) Decision process: school. Measures general tone of decision making procedures within the school. (CLIMDECP)

C3. When decisions are made, it is usually clear what needs to be done to carry them out.

C8. People do a good job of examining a lot of alternative solutions to problems before deciding to try one.

C59. The staff makes good decisions and solves problems well.

C74. After decisions are made, nothing is usually done about them.

C85. Decisions are made by people who have the most adequate and accurate information.

(c) Team cooperation: school. Measures extent of internal teamwork. (CLIMCOOP)

C89. There is an "every person for themselves" attitude.

(d) General adult working climate. Measures overall rating of the organizational climate of the school. (CLIMGENL)

Teacher Interview, Item 3, page 6.

If you had to rate the general adult working "climate" at this school on a ten-point scale, with 10 being the most positive and 1 being the most negative, where would you place this school? By climate, we mean things like:

cooperation, motivation, openness, flexibility, trust, support, warmth, consideration, morale, ease of problem-solving, etc.

TRUST

The Trust index describes the extent to which school staff have trust in the principal. While primarily an intervening variable, Trust is viewed as somewhat causal in nature. The construct tapped by this variable is one that is built up over time by the causal activities of the principal.

(a) *Trust by and in principal*. Measures extent to which teachers perceive the principal as having trust in them and the extent to which they trust the principal. (TRSTPRIN)

C44. The staff members trust the principal.

C66. The principal trusts the staff members.

PEER WORK ENVIRONMENT

The Peer Work Environment index describes teacher perceptions of the interpersonal and task related behavior occurring within the school staff. This index is composed of subindices reflecting perceptions of various peer leadership functions and group processes occurring internal to the organization. It consists of five subindices.

(a) *Communication*. Measures adequacy of information flow within the school staff. (PEERCOM)

C15. Information is shared between teachers from *different* departments, teams, or grade levels.

C29. Staff members don't listen to each other.

C78. Information is shared between teachers *within* the *same* department, team, or grade level.

(b) Peer team building. Measures extent to which teachers cooperate with and support each other. (PEERTB)

C37. Staff members support and encourage each other.

C71. There is a great deal of cooperative effort among staff members.

C75. Teachers from one department, team, or grade level have personal respect for those from other departments, teams, or grade levels.

C79. Staff members are tolerant of each others opinions even if those opinions are different from their own.

(c) Conflict Resolution. Measures ways conflict situations are handled within the school staff. (PEERCONR)

C81. When conflicts occur between the staff members, they handle them constructively rather than destructively.

(d) Reinforcing Environment. Measures extent to which working in the school is seen as an intrinsically rewarding experience. (PEERENV)

C45. Most people who are teaching in this school find their job rewarding in other than monetary ways.

C50. Staff members create a highly reinforcing environment, rewarding each other for their efforts.

(e) Trust in peers. Measures extent to which teachers trust and have confidence in other teachers. (PEERTRST).

C68. There are several staff members whom I don't really trust very much.

C72. Staff members don't really trust each other enough.

JOB SATISFACTION

The Job Satisfaction index describes the extent to which teachers feel adequately compensated by various aspects of their job situation. It also expresses teacher contentment with the working environment. It consists of six subindices.

(a) *With reward system*. Measures extent to which teachers feel adequately compensated by both intrinsic and extrinsic rewards. (JSATREWD)

C9. Staff members are recognized for a job well done.

(b) *With evaluation system*. Measures extent to which teachers are satisfied with systems of teacher performance rating. (JSATEVAL)

B99. In general, how satisfied are you with the current teacher evaluation system used at this school? (Measured on a four-point Likert scale ranging from 1 [very dissatisfied] to 4 [very satisfied]. Responses are recoded 1, 2 = 0; 3, 4 = 1)

(c) *With influence*. Measures extent of difference between the amount of influence teachers think they should have and the amount they believe they do have. (JSAT INFL)

Below is a list of people and organizations who might make decisions for this school.

FOR EACH PERSON OR ORGANIZATION	FIRST: How much influence does each NOW HAVE in making decisions for this school? (P21)	SECOND: How much influence do you think each SHOULD HAVE? (P33)
Teachers at this school...	(P21)	(P33)

(Response options for both P21 and P33 = (1) No influence; (2) Some influence; (3) A lot of influence. Scale score computed by taking the absolute value of the difference between influence now had (P21) and influence wanted (P33) = P21-P33.)

(d) With the Organization. Measures extent to which teachers look forward to their working day. (JSATORG)

C83. I usually look forward to each working day at this school.

(e) Morale. Measures level of pride in and commitment to the school. (JSATMOR)

C65. Staff members are proud to be working in this school.

C76. The morale of staff members is rather low.

C100. Staff members have a high degree of commitment to their jobs.

(f) General satisfaction level. A composite index of teacher satisfaction. Overall school graded A, B, C, D, Fail. (JSATGENL)

D11. Students are often given the grades A, B, C, D, and FAIL to describe the quality of their work. If schools could be graded in the same way, what grade would you give this school?

(Response options: A, B, C, D, Fail)

JOB PERFORMANCE

The Job Performance index describes the quality of work performed by the school, as seen by various data sources other than teachers (parents, students, archival records). It consists of five subindices.

(a) School rating. A composite overall rating of the school. Schools graded A, B, C, D, Fail, by parents and students. (JPERGRD)

Parent Survey Item B11.

Student Survey Item A39.

Students are often given the grades A, B, C, D, and FAIL to describe the quality of their work. If schools could be graded in the same way, what grade would you give this school?

(Response options: A, B, C, D, Fail)

(b) Student absence. Average daily student absenteeism for preceding five-year period. (JPERABS)

School Secretary Survey, Item 6.

Student absentee rate:_____.

(c) Student vandalism. Dollar amount of student vandalism during the preceding year. (JPERVAND)

School Secretary Survey, Item 11.

Vandalism--description, frequency, approximate annual cost. _____.

(d) Student drop out rate. Percentage of students voluntarily withdrawing from school during the preceding year. (JPERDROP)

School Secretary Survey, Item 7.

Student drop-out rate:_____.

(e) Goal Consensus. A measure of agreement on general goals for the school across various data sources (parents, students, teachers). (JPERGOAL)

Schools usually provide education in a variety of areas. However, some areas may be more important at one school than at another.

1. As far as you can tell, how important does THIS SCHOOL think each of the following areas is for the education of students at this school?

   a. SOCIAL DEVELOPMENT (Instruction which helps students learn to get along with other students and adults, prepares students for social and civic responsibility, develops students' awareness and appreciation of our own and other cultures).

b. INTELLECTUAL DEVELOPMENT (Instruction in basic skills in mathematics, reading, and written and verbal communication; and in critical thinking and problem-solving abilities).

c. PERSONAL DEVELOPMENT (Instruction which builds self-confidence, creativity, ability to think independently, and self-discipline).

d. VOCATIONAL DEVELOPMENT (Instruction which prepares students for employment, development of skills necessary for getting a job, development of awareness about career choices and alternatives).

Teacher Survey Item D5.
Parent Survey Item B5.
Student Survey Item A59.

Which one do you think receives the most emphasis at this school?

- o Social Development
- o Intellectual Development
- o Personal Development
- o Vocational Development

(Scale score computed by taking the absolute value of the difference between teacher [T], parent [P] and student [S] perceptions = [T-P] + [T-S] + [P-S].

OTHER CAUSAL VARIABLES

Other causal variables are those which represent exogenous variables other than those posited by the Likert model or by the alternative models of Subproblem Three.

(a) School SES. Socioeconomic status of the area in which the school is located and from which students are drawn, rated from low to high. (SES)

District Building & Site Office Survey, Item 11.

What is the range and median of property values in the school attendance area?

(b) Environmental Turbulence. Examines the political "climate" of the community surrounding the school organization (ENV).

From anecdotal information contributed by data collection staff.

A turbulent environment was conceptualized as one in which there had occurred one or more hotly-contested school board elections, educational millage votes, or school bond votes during the preceeding year. A static environment was conceptualized as one in which the above did not occur.

(c) Goal Clarity. Extent to which faculty members are clear on job goals and duties. (GOALCLAR)

C82. My work objectives are very clear and specific; I know exactly what I am to do as a staff member.

APPENDIX B

INTERCORRELATIONS AMONG THE SUBINDICES INCLUDED AS A RESULT OF THE DATA TREATMENT FOR SUBPROBLEM ONE (ALL SCHOOLS)

INTERCORRELATIONS AMONG THE SUBINDICES INCLUDED AS A RESULT OF THE DATA TREATMENT FOR SUBPROBLEM ONE (ALL SCHOOLS)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	(1) LEADPSPT	1.0																														
	(2) LEADIDEA	.89	1.0																													
	(3) LEADGOAL	.88	.79	1.0																												
LEADERSHIP	(4) LEADTB	.90	.85	.86	1.0																											
	(5) LEADWFAC	.87	.81	.93	.85	1.0																										
	(6) LEADPTDM	.88	.86	.76	.81	.79	1.0																									
	(7) LEADCOM	.87	.80	.84	.83	.77	.74	1.0																								
	(8) CLIMGOAL	.64	.63	.68	.51	.64	.70	.52	1.0																							
CLIMATE	(9) CLIMDECP	.84	.79	.86	.78	.83	.88	.75	.85	1.0																						
	(10) CLIMCOOP	.75	.70	.71	.65	.68	.84	.67	.79	.94	1.0																					
	(11) CLIMGENL	.76	.64	.70	.58	.72	.79	.62	.80	.86	.87	1.0																				
TRUST	(12) TRSTPRIN	.86	.73	.82	.74	.79	.74	.89	.60	.80	.72	.71	1.0																			
	(13) PEERCOM	.66	.56	.68	.55	.61	.71	.58	.80	.83	.83	.72	.71	1.0																		
PEER	(14) PEERTB	.71	.71	.70	.60	.66	.82	.62	.86	.90	.92	.84	.69	.88	1.0																	
WORK	(15) PEERCONR	.79	.74	.75	.68	.70	.80	.69	.77	.92	.89	.75	.78	.88	.88	1.0																
ENVIRONMENT	(16) PEERENV	.72	.78	.70	.62	.70	.85	.59	.86	.91	.92	.84	.63	.77	.94	.87	1.0															
	(17) PEERTRST	.63	.68	.60	.49	.56	.74	.56	.84	.82	.88	.75	.69	.85	.93	.83	.89	1.0														
	(18) JSATREWD	.82	.81	.83	.83	.80	.83	.75	.67	.81	.70	.66	.64	.59	.68	.68	.69	.55	1.0													
	(19) JSATEVAL	.75	.70	.69	.64	.62	.79	.53	.68	.75	.73	.71	.56	.71	.77	.75	.79	.70	.70	1.0												
JOB	(20) JSATINFL	.65	.68	.63	.67	.61	.83	.54	.65	.80	.79	.64	.51	.62	.78	.74	.82	.67	.79	.78	1.0											
SATISFACTION	(21) JSATORG	.50	.59	.43	.38	.47	.59	.28	.63	.60	.55	.58	.36	.36	.53	.59	.71	.54	.49	.64	.60	1.0										
	(22) JSATMOR	.79	.80	.77	.69	.78	.86	.65	.88	.93	.91	.88	.72	.75	.89	.85	.94	.86	.75	.78	.76	.75	1.0									
	(23) JSATGENL	.77	.74	.77	.68	.83	.75	.53	.80	.83	.70	.78	.63	.59	.68	.69	.78	.66	.74	.69	.61	.74	.89	1.0								
	(24) JPERGRD	.62	.62	.67	.46	.67	.51	.40	.64	.63	.53	.61	.54	.53	.49	.60	.61	.54	.49	.62	.38	.64	.72	.76	1.0							
JOB	(25) JPERABS	.44	.36	.44	.35	.46	.51	.27	.67	.60	.52	.59	.48	.69	.59	.61	.54	.57	.49	.53	.47	.39	.57	.62	.55	1.0						
PERFORMANCE	(26) JPERVAND	.27	.33	.32	.21	.36	.34	.08	.28	.30	.29	.17	.18	.47	.33	.36	.33	.35	.22	.44	.28	.17	.33	.24	.56	.20	1.0					
	(27) JPERDROP	.13	.30	.24	.11	.25	.31	.01	.51	.38	.41	.31	.03	.32	.40	.23	.45	.50	.32	.25	.27	.30	.50	.52	.47	.35	.34	1.0				
	(28) JPERGOAL	.31	.28	.26	.18	.21	.39	.14	.56	.52	.57	.45	.31	.51	.49	.53	.54	.61	.25	.52	.44	.52	.59	.56	.50	.47	.23	.55	1.0			
	(29) SES	.36	.46	.31	.36	.33	.45	.22	.38	.35	.25	.21	.16	.15	.28	.26	.41	.26	.53	.36	.44	.49	.39	.57	.15	.23	.15	.29	.31	1.0		
OTHER	(30) ENV	.34	.53	.20	.25	.36	.45	.11	.41	.37	.39	.35	.21	.27	.43	.38	.58	.49	.23	.49	.43	.66	.54	.47	.58	.29	.52	.36	.41	.11	1.0	
CAUSAL	(31) GOALCLAR	.72	.54	.68	.68	.64	.67	.68	.45	.69	.60	.62	.68	.41	.46	.53	.49	.39	.68	.53	.57	.43	.62	.65	.37	.31	.08	.10	.48	.43	.06	1.0

N = 25 Schools

APPENDIX C

FACTOR ANALYSIS OF 30 VARIABLES
(SUBPROBLEM THREE)

TABLE E.1

VARIANCE EXPLAINED BY EACH OF FIVE UNROTATED PRINCIPAL AXIS FACTORS AND CUMULATIVE VARIANCE

Factor	Variance Explained	Cumulative Percent of Total Variance
1	18.426	61.40
2	2.513	69.80
3	1.448	74.60
4	1.279	78.90
5	.849	81.70

Note: Total variance is defined as the sum of the diagonal elements of the correlation (covariance) matrix.

N=25

TABLE E.2

DIRECT OBLIMIN ROTATED FACTOR LOADINGS (PATTERN)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
PEERCOM	0.936	0.124	-0.271	-0.026	0.005
PEERTB	0.923	0.071	0.017	-0.087	-0.163
PEERTRST	0.918	-0.039	-0.008	-0.124	-0.027
CLIMCOOP	0.844	0.167	0.052	-0.013	-0.088
PEERCONR	0.728	0.286	-0.042	-0.093	-0.061
CLIMGOAL	0.710	0.091	0.130	-0.029	0.207
CLIMGENL	0.629	0.306	0.054	0.059	0.141
CLIMDECP	0.626	0.416	0.097	-0.002	0.045
JPERGOAL	0.608	-0.277	0.249	-0.026	0.175
JPERABS	0.577	0.029	0.009	0.020	0.258
JSATMOR	0.553	0.278	0.228	-0.163	0.134
JSATINFL	0.526	0.156	0.396	-0.187	-0.332
LEADCOM	0.188	0.875	-0.079	0.123	-0.128
LEADTB	-0.010	0.867	0.154	-0.096	-0.122
LEADWFAC	-0.006	0.858	0.036	-0.172	0.177
LEADGOAL	0.128	0.854	-0.029	-0.038	0.159
LEADPSPT	0.141	0.820	0.087	-0.099	-0.002
TRSTPRIN	0.381	0.733	-0.197	0.121	0.067
LEADIDEA	0.034	0.673	0.256	-0.361	-0.106
JSATREWD	0.165	0.624	0.329	-0.050	-0.073
GOALCLAR	0.151	0.593	0.332	0.313	0.109
SES	-0.051	0.134	0.748	0.100	0.028
JSATORG	0.157	0.066	0.536	-0.309	0.148
ENV	0.050	-0.064	0.210	-0.755	0.036
JPERVAND	0.092	0.079	-0.310	-0.739	0.044
JPERGRD	-0.018	0.446	-0.062	-0.467	0.602
JSATEVAL	0.433	0.253	0.202	-0.303	-0.078
JPERDROP	0.317	-0.230	0.207	-0.215	0.313
JSATGENL	0.149	0.451	0.401	-0.085	0.453
LEADPTDM	0.406	0.460	0.267	-0.189	-0.196
VP[a] N=25	7.173	6.734	2.049	2.030	1.231

Note: The above factor loading matrix has been rearranged so that the columns appear in decreasing order of variance explained by factors. The rows have been rearranged so that for each successive factor, loadings greater than 0.5000 appear first.

[a] The VP for each factor is the sum of the squares of the elements of the column of the factor pattern matrix corresponding to that factor.

TABLE E.3

ROTATED FACTOR CORRELATIONS

FACTOR	1	2	3	4	5
1	1.000				
2	0.574	1.000			
3	0.373	0.288	1.000		
4	-0.407	-0.210	-0.167	1.000	
5	0.278	0.029	0.185	-0.233	1.000

APPENDIX D

SUMMARY OF MODELS TESTED

(SUBPROBLEM THREE)

TABLE F.1

MODELS CONTAINING FOUR LATENT VARIABLES

Model	x^2	df	α	PARAMETERS												
				L-IW	L-P	L-S	IW-P	IW-S	P-S	IW-L	P-L	S-L	P-IW	S-IW	S-P
1	Does Not Converge			*	0	0	*	*	$\overline{*}$	0	0	0	0	0	$\overline{*}$
2	Does Not Converge			*	0	0	*	*	*	0	0	0	0	0	0
3	Does Not Converge			*	0	0	*	*	0	0	0	0	0	0	*
4	90.6407	(65)	.0195	1.449	0	0	.633	.744	0	0	0	0	0	0	0
5	Does Not Converge			*	*	*	*	*	$\overline{*}$	0	0	0	0	0	$\overline{*}$
6	Does Not Converge			*	*	*	*	*	*	0	0	0	0	0	0
7	Not Identified			*	*	*	*	0	*	0	0	0	0	0	*
8	66.2561	(63)	.3653	1.239	-.470	1.301	.857	0	$\overline{.641}$	0	0	0	0	0	$\overline{.641}$
9	66.9448	(63)	.3433	1.261	.465	.982	.515	0	2.152	0	0	0	0	0	0
10	Does Not Converge			*	*	*	*	0	0	0	0	0	0	0	*
11	Improper Solution			*	*	*	*	0	0	0	0	0	0	0	0
12	Does Not Converge			*	*	0	*	*	$\overline{*}$	0	0	0	0	0	$\overline{*}$
13	Not Identified			*	*	0	*	$\overline{*}$	$\overline{*}$	0	0	0	0	$\overline{*}$	$\overline{*}$
14	66.5908	(63)	.3545	1.224	0	1.022	.778	-.006	$\overline{.644}$	0	0	0	0	0	$\overline{.644}$
15	66.5702	(63)	.3552	1.194	0	1.068	.673	$\overline{.022}$	$\overline{.627}$	0	0	0	0	$\overline{.022}$	$\overline{.627}$
16	66.4792	(63)	.3581	1.239	0	1.111	.689	0	.842	0	0	0	0	0	.433
17	66.5909	(64)	.3879	1.224	0	1.020	.771	0	$\overline{.642}$	0	0	0	0	0	$\overline{.642}$
17.1	125.7701	(73)	.0001	1.049	0	1.216	.680	0	$\overline{.599}$	0	0	0	0	0	$\overline{.599}$
18	67.6645	(64)	.3532	1.302	0	1.070	.714	0	1.229	0	0	0	0	0	0
18.1	125.6714	(73)	.0001	1.045	0	2.097	.744	0	2.374	0	0	0	0	0	0
19	76.3438	(64)	.1388	1.039	0	1.205	.333	0	0	0	0	0	0	0	1.832
20	95.9218	(65)	.0076	1.040	0	1.009	.803	0	0	0	0	0	0	0	0
21	Not Identified			*	0	0	*	0	*	0	0	*	0	0	*
22	Large Standard Errors			*	0	*	*	0	$\overline{*}$	0	0	*	0	0	$\overline{*}$
23	Not Identified			0	*	0	$\overline{*}$	0	$\overline{*}$	0	0	*	$\overline{*}$	0	$\overline{*}$
A	Does Not Converge			0	0	0	*	*	$\overline{*}$	*	0	0	0	0	$\overline{*}$
B	Not Identified			0	*	*	*	0	*	*	0	0	0	0	*
C	66.2561	(63)	.3653	0	-.295	.817	1.364	0	$\overline{.641}$	1.239	0	0	0	0	$\overline{.641}$
D	66.9448	(63)	.3433	0	.289	.610	.829	0	2.152	1.261	0	0	0	0	0
E	Does Not Converge			0	*	*	*	0	0	*	0	0	0	0	*
F	Improper Solution			0	*	*	*	0	0	*	0	0	0	0	0
G	66.5909	(64)	.3879	0	0	.645	1.219	0	$\overline{.642}$	1.224	0	0	0	0	$\overline{.642}$
H	67.6645	(64)	.3532	0	0	.652	1.172	0	1.229	1.302	0	0	0	0	0

TABLE F.1 (Continued)

L-IW = Path from Leadership to Internal Work Environment

L-P = Path from Leadership to Performance

L-S = Path from Leadership to Satisfaction

IW-P = Path from Internal Work Environment to Performance

IW-S = Path from Internal Work Environment to Satisfaction

P-S = Path from Performance to Satisfaction

IW-L = Path from Internal Work Environment to Leadership

P-L = Path from Performance to Leadership

S-L = Path from Satisfaction to Leadership

P-IW = Path from Performance to Internal Work Environment

S-IW = Path from Satisfaction to Performance

NOTE 1: All path estimates are unstandardized LISREL estimates.

NOTE 2: A bar (——) over any path coefficient indicates that it and its reciprocal are constrained to equality.

NOTE 3: A "0" indicates a path not included in a given causal model.

NOTE 4: An * indicates a path included in a non-fitting model.

TABLE F.2

MODELS CONTAINING SIX LATENT VARIABLES

Model	χ^2	df	α	L-IW	L-P	L-S	L-SE	L-E	IW-P	IW-S	IW-SE	IW-E	P-S	P-SE	P-E	S-SE	S-E	SE-E	IW-L	P-L	S-L	SE-L	E-L	P-IW	S-IW	SE-IW	E-IW	S-P	SE-P	E-P	SE-S	E-S	E-SE
24	115.6910	(88)	.0256	1.214	0	.926	0	0	.713	0	0	0	$.\overline{884}$	0	0	0	0	$.\overline{058}$	0	0	0	0	0	0	0	0	0	$.\overline{884}$	1.660	4.975	1.841	-4.448	$.\overline{058}$
25	116.6940	(88)	.0220	1.270	0	1.681	0	0	.647	0	0	0	2.895	0	0	0	0	$.\overline{058}$	0	0	0	0	0	0	0	0	0	0	.180	.800	.628	-2.332	$.\overline{058}$
26	119.8347	(90)	.0195	1.250	0	1.077	0	0	.749	0	0	0	1.565	0	0	$.\overline{136}$	0	$.\overline{021}$	0	0	0	0	0	0	0	0	0	0	0	0	$.\overline{136}$	.388	$.\overline{021}$
27	123.9509	(90)	.0103	1.114	0	1.032	0	0	.857	0	0	0	$.\overline{603}$	0	0	$.\overline{130}$	0	$.\overline{042}$	0	0	0	0	0	0	0	0	.201	$.\overline{603}$	0	0	$.\overline{130}$	0	$.\overline{042}$
28	124.1436	(89)	.0082	1.268	0	.718	0	0	1.116	0	0	0	1.538	0	0	$.\overline{123}$	0	$.\overline{037}$	0	0	0	0	0	0	0	0	0	0	.118	-.131	$.\overline{123}$	0	$.\overline{037}$

L-IW = Path from Leadership to Internal Work Environment
L-P = " " " to Performance
L-S = " " " to Satisfaction
L-SE = " " " to SES
L-E = " " " to Environment
IW-P = " " Internal Work Environment to Performance
IW-S = " " " to Satisfaction
IW-SE = " " " to SES
IW-E = " " " to Environment
P-S = " " Performance to Satisfaction
P-SE = " " " to SES
P-E = " " " to Environment
S-SE = " " Satisfaction to SES
S-E = " " " to Environment
SE-E = " " SES to Environment
IW-L = " " Internal Work Environment to Leadership
P-L = " " Performance to "
S-L = " " Satisfaction to "
SE-L = " " SES to "
E-L = " " Environment to "

P-IW = Path from Performance to Internal Work Environment
S-IW = " " Satisfaction to "
SE-IW = " " SES to "
E-IW = " " Enviornment to "
S-P = " " Satisfaction to Performance
SE-P = " " SES to "
E-P " " Environment to "
SE-S = " " SES to Satisfaction
E-S = " " Environment to "
E-SE = " " " to SES

NOTE 1: All path estimates are unstandardized LISREL estimates.

NOTE 2: A bar (——) over any path coefficient indicates that it and its reciprocal are constrained to equality.

NOTE 3: A "0" indicates a path not included in a given causal model.

TABLE F.3

MODELS CONTAINING FIVE LATENT VARIABLES

				PARAMETERS																				
Model	χ^2	df	α	L-IW	L-P	L-S	L-SE	IW-P	IW-S	IW-SE	P-S	P-SE	S-SE	IW-L	P-L	S-L	SE-L	P-IW	S-IW	SE-IW	S-P	SE-P	SE-S
29	86.4370	(76)	.1938	1.218	0	1.112	0	.754	0	0	$\overline{.854}$	0	0	0	0	0	0	0	0	0	$\overline{.854}$	-2.046	2.203
30	86.7866	(76)	.1867	1.304	0	2.822	0	.712	0	0	4.285	0	0	0	0	0	0	0	0	0	0	.093	1.683

L-IW = Path from Leadership to Internal Work Enviroment
L-P = " " " to Performance
L-S = " " " to Satisfaction
L-SE = " " " to SES
IW-P = " " Internal Work Environment to Performance
IW-S = " " " to Satisfaction
IW-SE = " " " to SES
P-S = " " Performance to Satisfaction
P-SE = " " " to SES
S-SE = " " Satisfaction to SES
IW-L = " " Internal Work Environment to Leadership
P-L = " " Performance to "
S-L = " " Satisfaction to "
SE-L = " " SES to "
P-IW = " " Performance to Internal Work Environment
S-IW = " " Satisfaction to "
SE-IW = " " SES to "
S-P = " " Satisfaction to Performance
SE-P = " " SES to "
SE-S = " " SES to Satisfaction

NOTE 1: All path estimates are unstandardized LISREL estimates.

NOTE 2: A bar (——) over any path coefficient indicates that it and its reciprocal are constrained to equality.

NOTE 3: A "0" indicates a path not included in a given causal model.

APPENDIX E

COMPARISON OF FIT BETWEEN VARIOUS MODELS

COMPARISON OF FIT BETWEEN VARIOUS MODELS

Models	χ^2 (df)$_A$ - χ^2 (df)$_B$ [a]	=	χ^2 (df) Difference	Path(s)[b] of Interest	Probability[c]
4 vs. 14	90.6407 (65)-66.5908 (63)		24.0499 (2)	L-S;S:P	.001
4 vs. 15	90.6407 (65)-66.5702 (63)		24.0705 (2)	L-S;S:P	.001
17 vs. 8	66.5909 (64)-66.2561 (63)		.3348 (1)	L-P	.59 *
19 vs. 8	76.3438 (64)-66.2561 (63)		10.0877 (1)	L-P	.005
17 vs. 14	66.5909 (64)-66.5908 (63)		.0001 (1)	IW-S	—— *
17 vs. 15	66.5909 (64)-66.5702 (63)		.0207 (1)	IW:S	—— *
19 vs. 14	76.3438 (64)-66.5908 (63)		9.7530 (1)	IW-S	.005
19 vs. 15	76.3438 (64)-66.5702 (63)		9.7736 (1)	IW:S	.005
18 vs. 14	67.6645 (64)-66.5908 (63)		1.0737 (1)	IW-S	.32 *
18 vs. 15	67.6645 (64)-66.5702 (63)		1.0943 (1)	IW:S	.31 *
18 vs. 9	67.6645 (64)-66.9448 (63)		.0720 (1)	L-P	.79 *
18 vs. 8	67.6645 (64)-66.2561 (63)		1.4084 (1)	L-P	.24 *
20 vs. 18	95.9218 (65)-67.6645 (64)		28.2573 (1)	P-S	.001
20 vs. 14	95.9218 (65)-66.5908 (63)		29.3310 (2)	IW-S;S:P	.001
20 vs. 15	95.9218 (65)-66.5702 (63)		29.3516 (2)	IW:S;S:P	.001
20 vs. 8	95.9218 (65)-66.2561 (63)		29.6657 (2)	L-P;S:P	.001
20 vs. 17	95.9218 (65)-66.5909 (64)		29.3309 (1)	S:P	.001
20 vs. 19	95.9218 (65)-76.3438 (64)		19.5780 (1)	P-S	.001
20 vs. 9	95.9218 (65)-66.9448 (63)		28.9770 (2)	L-P;P-S	.001

Notes: [a] The ordering of the χ^2 (df) values corresponds to the order given in the Models column.

[b] L=Leadership
IW=Internal Work Environment
S=Satisfaction
P=Performance

Paths are indicated as follows:
L-S=path from Leadership to Satisfaction
L:S=reciprocal correlation of Leadership and Satisfaction.

[c] A low probability (large χ^2) indicates that the paths represented by the degrees of freedom are necessary. A high probability (small χ^2) indicates that the paths are not required.

*=Nonsignificant path.

APPENDIX F

MEASUREMENT AND CAUSAL STRUCTURES FOR MODELS WITH PATHS FROM INTERNAL WORK ENVIRONMENT TO LEADERSHIP

FIGURE H.1

MODEL G

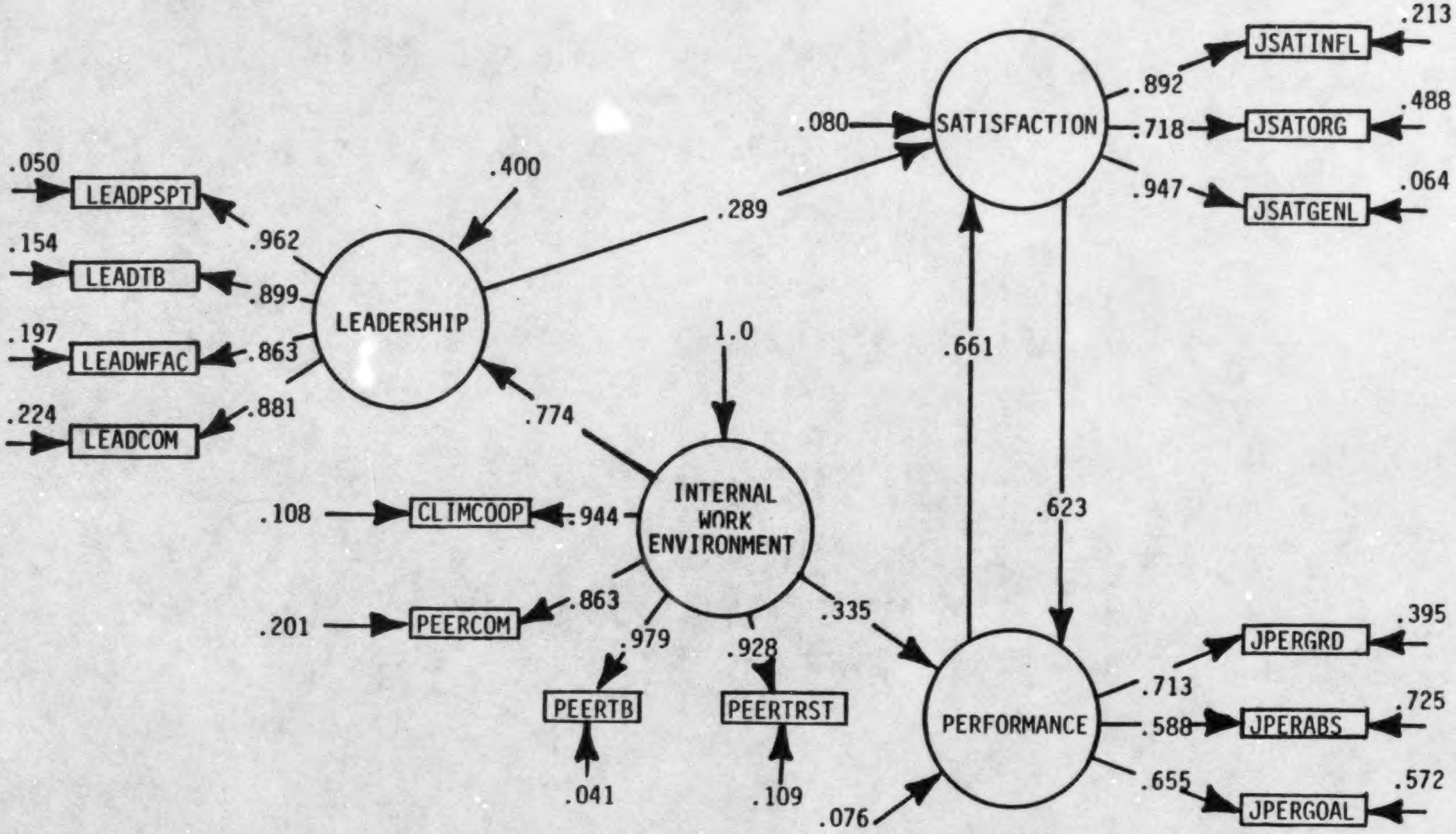
.213
JSATINFL
.892
.080
SATISFACTION
.718
JSATORG
.488
.947
JSATGENL
.064
.289
.400
.050
LEADPSPT
.962
.154
LEADTB
.899
LEADERSHIP
.197
LEADWFAC
.863
.224
LEADCOM
.881
.774
1.0
.661
.623
INTERNAL WORK ENVIRONMENT
.108
CLIMCOOP
.944
.201
PEERCOM
.863
.979
.928
.335
PEERTB
PEERTRST
.041
.109
JPERGRD
.395
.713
PERFORMANCE
.588
JPERABS
.725
.655
JPERGOAL
.572
.076

TABLE H.1

MEASUREMENT MODEL FOR MODEL G (FIGURE H.1)

	Unstandardized Estimate	Unstandardized Standard Error[a]	Standardized Estimate	Standardized Standard Error[a]	Critical Ratio[b]
Loading for:					
LEADPSPT on Leadership	.608	.097	.962	.153	6.29
LEADTB on Leadership	.569	.100	.899	.158	5.69
LEADWFAC on Leadership	.546	.098	.863	.155	5.57
LEADCOM on Leadership	.557	.104	.881	.164	5.37
CLIMCOOP on Int. Work Env.	.944	.152	.944	.152	6.21
PEERCOM on Int. Work Env.	.863	.151	.863	.151	5.72
PEERTB on Int. Work Env.	.979	.148	.979	.148	6.61
PEERTRST on Int. Work Env.	.928	.150	.928	.150	6.19
JPERGRD on Performance	.196	.130	.713	.473	1.51
JPERABS on Performance	.162	.113	.588	.410	1.43
JPERGOAL on Performance	.180	.121	.655	.440	1.49
JSATINFL on Satisfaction	.253	.182	.892	.642	1.39
JSATORG on Satisfaction	.203	.134	.718	.474	1.51
JSATGENL on Satisfaction	.268	.191	.947	.675	1.40
Factor Variance of:					
Internal Work Environment	1.000[c]		1.000[c]		
Regression Residuals for:					
Leadership	1.000[c]		.400		
Performance	1.000[c]		.076		
Satisfaction	1.000[c]		.080		
Residual Variance for:					
LEADPSPT	.050	.034			1.47
LEADTB	.154	.052			2.96
LEADWFAC	.197	.061			3.23
LEADCOM	.224	.069			3.25
CLIMCOOP	.108	.038			2.84
PEERCOM	.201	.063			3.19
PEERTB	.041	.023			1.78
PEERTRST	.109	.038			2.87
JPERGRD	.395	.127			3.11
JPERABS	.725	.179			4.05
JPERGOAL	.572	.143			4.00
JSATINFL	.213	.127			1.68
JSATORG	.488	.129			3.78
JSATGENL	.064	.080			0.80

TABLE H.1 (Continued)

	Unstandardized Estimate	Unstandardized Standard Error[a]	Standardized Estimate	Standardized Standard Error[a]	Critical Ratio[b]
Residual Covariance of:					
LEADPSPT & JPERGRD	.072	.042			1.71
LEADPSPT & JSATGENL	.079	.035			2.26
LEADTB & PEERTRST	-.044	.031			-1.42
LEADTB & JSATGENL	.098	.038			2.58
LEADWFAC & JPERGRD	.161	.057			2.82
LEADWFAC & JSATGENL	.181	.051			3.55
PEERCOM & JPERABS	.221	.084			2.63
JPERGRD & JSATINFL	-.241	.090			-2.68
JSATGENL & JSATINFL	-.239	.068			-3.51
Causal Effects of:					
Internal Work Environment on Leadership	1.224	.336	.774	.212	3.65
Leadership on Satisfaction	.645	.262	.289	.117	2.47
Internal Work Environment on Performance	1.219	.455	.335	.125	2.68
Performance on Satisfaction[d]	.642	.244	.661	.251	2.63
Satisfaction on Performance[d]	.642	.244	.623	.237	2.63

Test of Goodness of Fit: χ^2 (64) = 66.5909, p = 0.3879

[a] Standard Errors are simultaneous maximum likelihood estimates.

[b] Critical Ratio (C.R.) is the ratio of the parameter estimate to its standard error. Where standardized estimates are available, the critical ratio is the ratio of the standardized estimate to its standardized standard error. A C.R. > 2.00 is taken as a criterion for a parameter estimate that is significantly different from ero. For a two-tail test, p = .045, for a one-tail, p = .023.

[c] Denotes parameters that were fixed at the indicated values.

[d] Note that estimates of the path from Performance to Satisfaction and of the path from Satisfaction to Performance were constrained to equality. This equality of reciprocal causal paths may be interpreted as a correlation between the two variables.

[e] These regression residuals were fixed at the indicated values but do not imply a percentage of residual variation. Rather, they merely provide a set of constants which are necessary for unique estimation of other parameters in the model (i.e., identification constraints).

FIGURE H.2

MODEL H

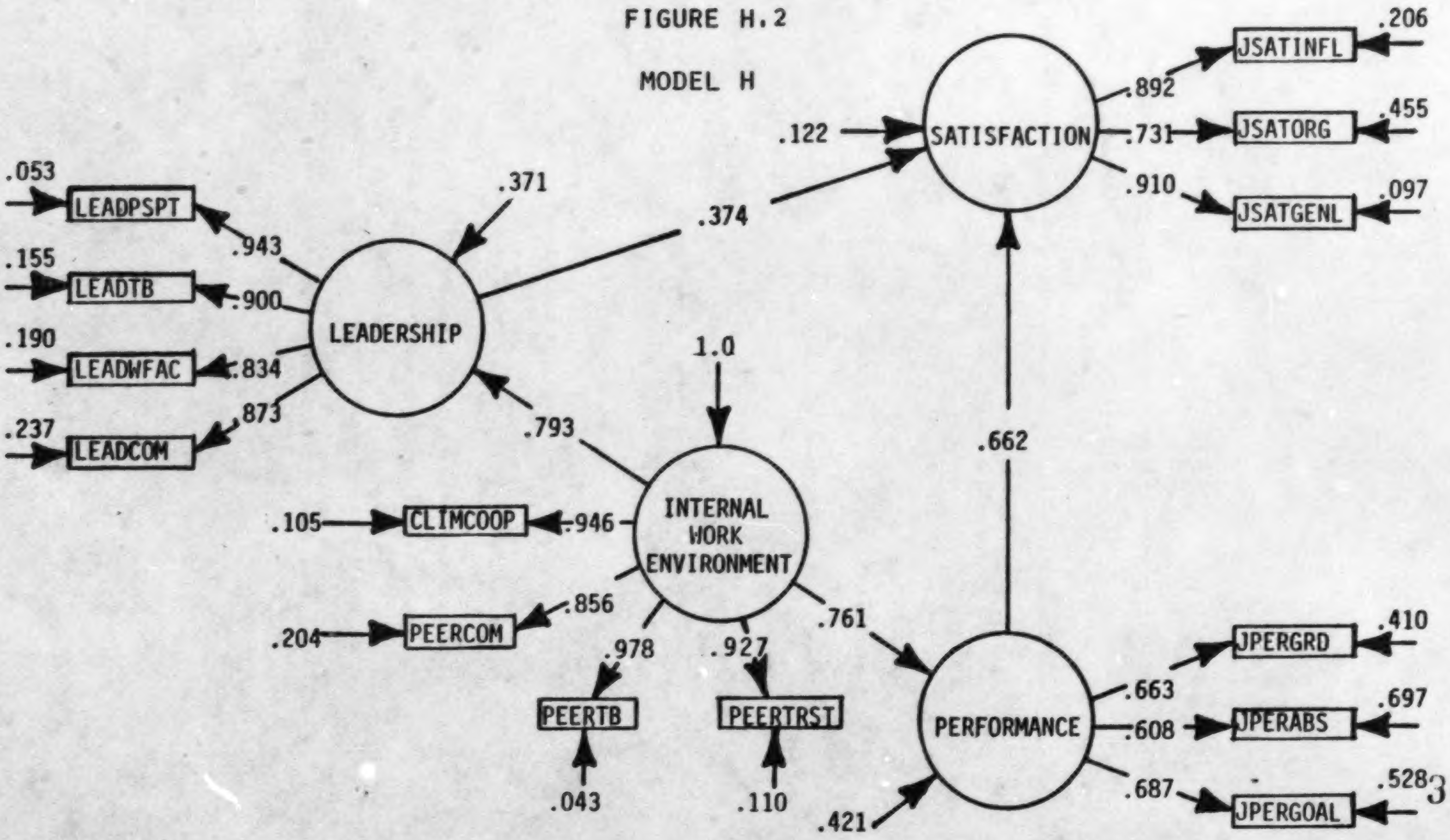
LEADERSHIP
INTERNAL WORK ENVIRONMENT
SATISFACTION
PERFORMANCE
LEADPSPT
LEADTB
LEADWFAC
LEADCOM
CLIMCOOP
PEERCOM
PEERTB
PEERTRST
JSATINFL
JSATORG
JSATGENL
JPERGRD
JPERABS
JPERGOAL
.053
.155
.190
.237
.943
.900
.834
.873
.371
.374
.122
.892
.731
.910
.206
.455
.097
1.0
.793
.105
.946
.204
.856
.978
.927
.043
.110
.761
.662
.421
.663
.608
.687
.410
.697
.528

TABLE H.2

MEASUREMENT MODEL FOR MODEL H (FIGURE H.2)

Parameter	Unstandardized Estimate	Unstandardized Standard Error^a	Standardized Estimate	Standardized Standard Error^a	Critical Ratio^b
Loading for:					
LEADPSPT on Leadership	.574	.089	.943	.146	6.40
LEADTB on Leadership	.548	.095	.900	.156	5.77
LEADWFAC on Leadership	.508	.087	.834	.143	5.83
LEADCOM on Leadership	.532	.098	.873	.161	5.42
CLIMCOOP on Int. Work Env.	.946	.152	.946	.152	6.22
PEERCOM on Int. Work Env.	.856	.150	.856	.150	5.71
PEERTB on Int. Work Env.	.978	.148	.978	.148	6.61
PEERTRST on Int. Work Env.	.927	.150	.927	.150	6.18
JPERGRD on Performance	.430	.111	.663	.171	3.88
JPERABS on Performance	.395	.103	.608	.159	3.82
JPERGOAL on Performance	.446	.106	.687	.163	4.21
JSATINFL on Satisfaction	.312	.133	.892	.380	2.35
JSATORG on Satisfaction	.256	.091	.731	.260	2.81
JSATGENL on Satisfaction	.318	.134	.910	.383	2.38
Factor Variance of:					
Internal Work Environment	1.000^c		1.000^c		
Regression Residuals for:					
Leadership	1.000^e		.371		
Performance	1.000^e		.421		
Satisfaction	1.000^e		.122		
Residual Variance for:					
LEADPSPT	.053	.034			1.56
LEADTB	.155	.052			2.98
LEADWFAC	.190	.059			3.22
LEADCOM	.237	.070			3.39
CLIMCOOP	.105	.037			2.84
PEERCOM	.204	.064			3.19
PEERTB	.043	.024			1.79
PEERTRST	.110	.038			2.89
JPERGRD	.910	.142			2.89
JPERABS	.697	.178			3.92
JPERGOAL	.528	.140			3.77
JSATINFL	.206	.124			1.66
JSATORG	.455	.135			3.37
JSATGENL	.097	.084			1.15

TABLE H.2 (Continued)

	Unstandardized Estimate	Unstandardized Standard Error[a]	Standardized Estimate	Standardized Standard Error[a]	Critical Ratio[b]
Residual Covariance of:					
LEADPSPT & JPERGRD	.086	.046			1.87
LEADPSPT & JSATGENL	.086	.036			2.39
LEADTB & PEERTRST	-.044	.031			-1.42
LEADTB & JSATGENL	.110	.040			2.75
LEADWFAC & JPERGRD	.162	.059			2.75
LEADWFAC & JSATGENL	.181	.051			3.55
PEERCOM & JPERABS	.224	.084			2.67
JPERGRD & JSATINFL	-.182	.086			-2.12
JSATGENL & JSATINFL	-.222	.070			-3.17
Causal Effects of:					
Internal Work Environment on Leadership	1.302	.345	.793	.210	3.78
Leadership on Satisfaction	.652	.326	.374	.187	2.00
Internal Work Environment on Performance	1.172	.333	.761	.216	3.52
Performance on Satisfaction	1.229	.636	.662	.343	1.93

Test of Goodness of Fit: χ^2 (64) = 67.6845, p = 0.3532

[a] Standard Errors are simultaneous maximum likelihood estimates.

[b] Critical Ratio (C.R.) is the ratio of the parameter estimate to its standard error. Where standardized estimates are available, the critical ratio is the ratio of the standardized estimate to its standardized standard error. A C.R. > 2.00 is taken as a criterion for a parameter estimate that is significantly different from zero. For a two-tail test, p = .045, for a one-tail, p = .023.

[c] Denotes parameters that were fixed at the indicated values.

[d] p=.054 (two-tail), p=.027 (one-tail)

[e] These regression residuals were fixed at the indicated values but do not imply a percentage of residual variation. Rather, they merely provide a set of constants which are necessary for unique estimation of other parameters in the model (i.e., identification constraints).

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